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THE CEYLON AND ORIENTAL INVESTMENT CORPORATION, LIMITED.

WE have now received from the Managing Director, Mr. J. Huntley Thring of Alford, Castle Cary, Somerset, and Dimbula, Ceylon, a copy of the prospectus of this newly-formed Association. Mr. Huntley Thring is associated with men of high commercial standing in the City in Mr. Arbuthnot of Messrs. P. Macfadyen & Co., Mr. Hancock of Messrs. Hancock Brothers & Co., Mincing Lane, Mr. Reiss of Messrs. L. Reiss Brothers & Co., and Mr. Cyril E. Johnston who was of Messrs. Edward Johnston, Son & Co., the largest exporters of coffee from Rio and who has one brother Deputy Chairman of the London Westminster and another brother Director of the Joint Stock Bank. The capital of the Company is fixed at so large an amount as £250,000 divided into 49,950 ordinary shares of £5 each and 250 Founders' shares of £1 each. The first issue of 9,950 ordinary, and 250 founders' shares, has, we learn, been already taken up. Five hundred shares are reserved for Ceylon and Mr. Huntley Thring, who will arrive here before Christmas, will represent the interests of the Company, along with Mr. E. G. Harding who will probably have the Colombo agency, and Mr. A. J. Denison. The New Oriental Bank will be Bankers. That such a Company should be organised and floated in the face of the commercial crisis London has just passed through, speaks well for the high credit of Ceylon and especially of her tea industry. It is in connection with the latter, of course, that the Corporation will be most concerned, establishing probably an extensive estate agency business; but very large powers are taken by the Directors which would enable them, if advisable, to take up any profitable Ceylon investments, such as Tramways or a short line of Railway, &c. There is at present, no Trust Association on a large scale operating in Ceylon and seeing how our tea industry is really still in its infancy, there should be plenty of scope for the Corporation, in the hands of Directors so sagacious and influential, doing a large and profitable business. That such is the anticipation may be judged from the following extract from the rule laid down for the guidance of the Directors:—

"The Founders' Shares will receive no dividend in any year until the Ordinary Shares have received 8 per cent. dividend for that year. After provision for a Reserve Fund and payment of 8 per cent. dividend on the Ordinary Shares, the Founders' Shares will (subject to the Memorandum and Articles of Association) be entitled to one moiety of the remaining net profits and the Ordinary Shares to the other moiety. Every allottee of 50 Ordinary Shares will be entitled to subscribe for and have allotted to him one Founders' Shares at a premium of £5; such premium to be applied in payment of all the preliminary expenses incidental to the formation of the Corporation."

The Prospectus—which will shortly be advertised in full in our columns—begins by stating that the "Corporation is established to deal mainly with Ceylon and Indian properties and Securities in the same manner and on the same lines as other Financial Companies have successfully dealt with General Securities." It then proceeds to refer to the rapid development of the Tea Industry, quoting Statistics from our "Ceylon Handbook and Directory" which stand out in bold relief, namely,—

Export of Tea.

1879..	95,969 lb.
1889..	34,345,852 „

[And who will venture to deny the probability of 1899—recording even more than 80,000,000 lb.]

We next read in the prospectus:—

The Tea Gardens of Ceylon being for the most part young, and not yet having reached maturity, are daily increasing in value and productiveness. The evenly distributed rainfall combined with the tropical climate causes the Tea bushes to "flush" almost continuously throughout the year, thereby bringing the average cost of production to even less than that of India while owing to the preference given to Ceylon Tea throughout England and the Colonies, the average price obtained is higher. It is not proposed to purchase properties except under special circumstances but to grant loans on the security

of Mortgages of Tea and other Estates and so to secure the consignment of the crops to the Corporation for sale, and it is anticipated that the mortgage interest and the commission on the sale of the produce will enable the Corporation to earn substantial dividends. As evidence of the profitable nature of Tea Growing in Ceylon, it may be mentioned that the Ceylon Tea Plantations Company, Limited, which was incorporated in December, 1886, has, for each of the three years since its formation, declared dividends amounting to 15 per cent. per annum.

There is then reference made to Mr. Huntley Thring's local experience and high character as affording a valuable guarantee for the success of the Corporation, and in every word of praise of the Managing Director we most fully concur; for no one is esteemed more highly among the Ceylon planting community, while he will have experienced and shrewd coadjutors in Messrs. E. G. Harding, A. J. Denison, and C. Murray Robertson. We wish the new Corporation all success.

HILL-COUNTRY PLANTING REPORT.

A VISIT TO THE KOTAGALOYA VALLEY—TEA A SUCCESS ON ABANDONED COFFEE ESTATES—HEDGES OF TEA.

NANUOYA, Nov. 19th.

With reference to my visit to the Kotagaloya valley (the name is derived from the resemblance of the "Duke's Nose" mountain, seen in profile, to a leopard *couchant*), I cannot help repeating my conviction that tea will be here as great a success as coffee was generally a failure, Passing through "Chrystler's Farm" *en route* to the station, we were struck with the splendid jât (indigenous, or as near it as possible) of young tea and its luxuriant growth. A really great work in the shape of a watercourse tapping the distant river was also remarkable. Factories are being erected in all directions, and the larger proportion of abandoned coffee estates are being redeemed. On an estate nearer the station, fine hedges of tea, topped at over 4 feet, which lined both sides of the road, formed striking features in the landscape. I thoroughly believe in the system. The bushes on the lower side of the path get the benefit of the heaped soil, while those on the upper side catch and are benefited by all *débris* of earth, leaves and prunings from above. Yesterday I went up the railway line to the third mile, and found that Mr. Wijenayeke had made considerable progress in blasting away the remarkable bed of rock at that point. He had obtained miners from the plumbago pits of the Kurunegala district, and had sixty at work boring holes and blasting. Ten of these, for the sake of extra pay, which they receive each day in ready cash, do a second task in the evenings of each day. The day-task, averaging 7 feet (one exceptional miner accomplishes 15 feet) is completed about 3 p.m., After refreshment, the evening task, averaging about 5 feet, is performed between 4 and 7 to 8 p.m. The work here takes more time and more dynamite and blasting powder, and is therefore more expensive than would be the case were the rock more granitic than it is. But it is true gneiss, in laminæ of about 2 feet thick, so that the holes bored in each stratum affect only the thickness of that particular layer. Some more or less decomposed matter intervenes between the hard strata. This rock obstacle to progress has its advantages. An enormous depôt of broken stone has been here formed, which, when trollies or trucks are able to run, can be conveyed along the line to where metal for ballasting is scarce. The feeling amongst the contractors is that delay at the lower end of the line is more likely to occur from paucity of metal for ballast than from any other cause. A gentleman who has a contract of two miles of rocky precipices near the Haputale end was much impressed with the almost exclusively earth formations at our end, especially in Mr. A. H. Thomas's great cutting on Abbotsford, which is now fast advancing to completion. The only rock here is in the shape of isolated boulders embedded in the earth. We were present at the undermining and loosening of one of those boulders from a position halfway up the 80 feet slope of ¾ in 1, and we felt real alarm at the recklessness of the coolies. One man *would* stand on the mass (about 3 tons in weight), while several would go under it, to undermine it with their alavangus. It was held in position by a sharp neck which went well into the bank, and which at length broke and released the boulder, enabling it to crash down harmlessly. The only accident on this big work, although operations have gone on in the night hours as well as by day, has been the fracture of the leg of a man who *would* stand on a mass of moving earth and got carried down with it. But of people aggregated in numbers some will die from disease, and one grave after another appears as time advances along the service road. Yesterday morning I saw a newly formed mound near Mr. Wijenayeke's contract, on which a bit of tin with pieces of charcoal had been placed, while marigolds had been planted around it. Such little attentions (although I fear the charcoal meant the conciliation of some god or demon,) shew the best side of human nature. But its weak side is shown by the grave of a little child close to our great cutting. The child died six miles up the line, but the body was brought down for burial by the parents avowedly for the purpose of being placed "where passengers by the railway might see the grave"! It is a curious fact that, no matter what the religious profession of the people, they very generally place a cross over the graves of their dead.

USEFUL TREES—BIRDS IN NUWARA ELIYA.

NANUOYA Nov. 21st.

Populnea Bucklandia (a grand relative of the Suriya tree) promises to be a great acquisition with us. We measured a couple of thick leathory leaves from young specimens which were a foot each way. The point projects from an almost perfect circle. The behaviour of different *Eucalypti* in our climate is curious. Most of our young plants have grown luxuriantly and did not seem to feel the recent south-west monsoon, while others have now practically to renew the whole of their foliage. Those trees grow under such different circumstances of climate in their native *habitats*, that it is only surprising how well most of them do here.

It would seem as if teal had not found their way up to Nuwara Eliya, after all. The specimen I received at Nuwara Eliya I saw only as a plucked bird, and all who spoke to me about the birds which had been so ruthlessly shot, called them teal. But last evening I received the following note from Mr. W. Tringham:—

"I hope the Local Board Ordinance will contain a clause giving the Boards power to pass bylaws for the protection of wild birds. The teal or widgeon are breeding on the lake. A little one was caught last evening the size of a frog, and I have sent it to Mr. LeMesurier this morning. Another nest was discovered, but the eggs were riddled with shot as the bird was killed as it rose from the nest. It is a great pity, but the report that a couple of teal were seen near the lake brings down the sportsmen in flocks."
Enclosed came a note from Mr. Le Mesurier to the following effect;—

"This is not a teal or widgeon, but a dabchick or little grebe. I caught one myself on the lake not long ago, while in company with its mother, but let it go again. Teal would breed here, I have no doubt, if let alone."

On turning to Legge's book, I find that the little grebe had found its way up to Nuwara Eliya a good many years ago. He writes:—"The dabchick is widely distributed throughout the lowcountry of Ceylon, besides which it has, I am informed, recently found its way up to the Nuwara Eliya Lake, which has an altitude of 6,200 feet. It is nowhere seen in larger numbers than on the Colombo Lake, where it is a permanent resident; on some occasions I have seen a flock of more than thirty on the larger sheet of water, and, as a general rule, there are a dozen or more in this locality. It is not uncommon in the tank districts from Kurunegala northwards, and I have met with it in small village tanks near Trincomalce. Its having ascended the highest mountains in the island and discovered the newly constructed Lake at Nuwara Eliya is very remarkable, as there is a rise to the plateau, both on its eastern and western side, of more than 2,000 feet, both streams flowing down precipitous and forest-clad gorges; but I am credibly informed by several people, and among them by Mr. Thwaites, of Hakgala, who pays particular attention to the birds of the district, that it *has* been seen there during the cool season." Legge adds that the bird is a most expert diver and that its note is a not unmusical whistle. From the testimony of Messrs. Le Mesurier and Tringham, it appears to have bred in Nuwara Eliya, so that, if properly protected, the Lake would have the attraction of flocks of the little grebe, with other aquatic birds, no doubt, on its bosom. It would be a thousand pities if the unregulated action of sportsmen should exterminate or frighten away these pretty and interesting birds. The amount of meat they yield cannot be a great temptation.

FINE SPECIMENS OF ALBIZZIA MOLUCCANA—THE MERITS AND DEFECTS OF THE ALBIZZIA—JAPANESE TIMBERS FOR TEA CHESTS—AN EXPERIMENTAL GROVE IN UDAPUSSELLAWA—THE "TALLOW WOOD" TREE AND THE KUMBUK FOR RAILWAY SLEEPERS—GUMS, GREVILLEAS, &C.—AFFORESTATION AT AND IMPROVEMENT OF NUWARA ELIYA.

NANUOYA, Nov. 25th.

I recently mentioned the truly noble growth of some specimens of *Albizzia moluccana* here, which are only nine years old. Those in Mr. Neate's garden at Nawalapitiya, which that gentleman kindly asked me, some time ago, to inspect, are, I believe, one, or perhaps two years older? Mr. Neate obtained the seed, probably, through the late Colonel Money. Not having been able to accept Mr. Neate's invitation to see his grand trees near at hand, I was glad to obtain the measurements taken by Mr. Alexander of the Forest Department. There are five trees which vary in girth from 64 to 71 inches, or practically 6 feet in the latter case! The height of the trees is from 90 to 100 feet. Mr. Munton, I am told, has similar trees in the Matale district; and I remember seeing a fine specimen in flower on Rosencath estate near Kandy. The foliage of these trees so closely resembles that of the Madagascar tree, *Poinciana regia*, that the two trees are frequently confounded. But the blossoms differ exceedingly: those of the *poinciana* being grand in size and colouring while the flowers of the *albizzia* are smaller and beautifully snow-white. Athough the spreading roots of this tree often vie in size with its immense trunk and large branches, it seems to do little or no harm to tea when growing amongst fields of that plant. Its great merits as a shade and shelter plant, are qualified by its brittleness, big branches being broken by the wind or falling down occasionally by their own weight. Many specimens, however, either grow unbrageously or shoot up tall and straight and are perfect specimens of grand trees. The timber is, evidently, not suitable for building purposes or fuel, but it would, no doubt, be excellent for tea boxes.

And this reminds me, that, after all, it was of "momi" I wrote recently as giving out no odour, when being planed by the carpenter. It resembles fine spruce deal, some of the pieces showing very beautiful markings, in parallel lines and wavings. I took it to be the wood of *Cryptomeria japonica*, from its close resemblance to that of the specimen of this so-called "cedar," which Mr. Nock recently cut down at Hakgala. That did not strike me as showing any dark heart-wood, but probably it was not old enough to develope a characteristic which is attributed to the mature cryptomeria. Of "Sugi" or the Japanese cedar, I have full details in Von Mueller and Gamble, but nowhere have I been able to find "Momi." From the appearance of the wood, it must be either a cupressus or pine, most probably the latter?

Mr. Alexander had, when he came to have a look at our older trees and our flourishing young plantings, just returned from visiting a Government plantation of Grevilleas, Eucalypts, &c., in Udapussellawa. All the trees in this experimental grove were doing well, but the tree which had grown beyond all compare was *E. microcorys*, one of the "stringy barks" of New South Wales and Queensland, and known by the colonists as "tallow wood." A specimen only 8 years old measured by Mr. Alexander was 64 inches (5 feet 4 inches) in girth and tall in proportion. The Forest Department have, in consequence of such growth and the known qualities of the timber, ordered a large supply of the seed of this tree. Von Mueller describes it as attaining to a great size; barrel up to 100 feet in length and to 7 feet *in diameter*! The wood is yellowish, free from kino particles, easily worked by saw or plane; it is of a very greasy nature, so much so as to be quite slippery when fresh cut. (Hence no doubt its popular name of "tallow wood.") The oily substance prevents the wood from splitting or twisting, though not from shrinking. The timber is hard and durable underground, and *is employed for railway sleepers*, wheelwrights' work, for knees and breast-hooks in ship-building; the *young trees serve for telegraph poles.* [This points to planting pretty closely, thinning for telegraph poles and like purposes, and leaving the finest trees wide apart to grow until suitable for conversion into railway sleepers.] The foliage is remarkably rich in volatile oil. In some parts of India this tree has grown 30 feet in two years, or at the rate of 15 feet per annum, $1\frac{1}{4}$ foot per mensem, or $\frac{1}{2}$ inch per diem. In British Guiana the growth was still more rapid, up to 18 inches in one year! This tree is likely to be a great acquisition in Ceylon, especially if the railway department accept the timber for sleepers. At present the only hard wood grown in Ceylon which finds ready acceptance for use on the railway is the product of a tree peculiar to Ceylon, the *doon*—the red variety being preferred. *Kumbuk*, which grows to such an enormous size on the banks of streams, is also to be tried in considerable quantity. I will be much surprised if the timber of this grand tree is not favourably reported on, but many of our rivers will suffer in picturesqueness by the denudation which will follow the extended use of the timber. In some of the very aged specimens on the banks of the Arivi-aru in the North-Central Province, there are caves in which human

beings as well as whole families of wild animals might find lodgement. The mode in which fresh bark forms continually on the edges of hollows in the trees is most remarkable. The blossom of these fine, waterloving trees, with their thick bark, rich in lime, is beautiful and sweet-scented.

I remember well the time, not more than 15 or 16 years ago, when poor George Smith planted *Eucalypts*, *Grevilleas*, *Araucarias* and *Cupressus torulosa* around the then newly-built bungalow of Dessford. Last evening I was able to compare, or rather to contrast, the gigantic height and the corresponding girth of the trees with their size when planted. Some of the tall, straight, clean, columnar "gums" are over 100 feet high and stout of stem in proportion. Others are magnificently umbrageous. The Grevilleas are only second to the Eucalypts (one of which seems to be *E. amaygdalina*, the tallest tree in the world) in upward growth. The soil on the comparative flat is good, the elevation under 5,000 feet, and the position is largely sheltered, so that all the conditions are favourable. Mr. Rosling's experience of blue gum timber (unseasoned) was similar to our own: it warped. It ought not, really, to be used for buildings, until six months after felling. But we were greatly interested in a large stable door, composed of fine plants of a Grevillea tree, certainly not more than 16 years old (if that), which had been cut down and converted into timber. Made into the door, when freshly sawn, this valuable wood had subsequently seasoned without in the least warping. Such being his experience, we were not surprised to learn that Mr. Rosling intended to cut down some of the older Grevilleas which can be spared from the large number on Lorne, to be converted into floor boards. *Grevillea robusta* is certainly, for beauty of foliage, for tenacity of vitality (it scarcely ever fails in planting), for fair rapidity of growth and value of timber at a comparatively early age, one of the most valuable gifts which Australia has bestowed on Ceylon. It flourishes from sea-level to 6,000 feet, and we do not wonder at its great popularity and wide diffusion. If a *casuarina* or a *frenela* is allowed to grow somewhat big in the nursery, it almost infallibly dies when planted out, while the Grevillea flourishes equally as a seedling, a well-grown plant, or as a "stump." Prizing as we do our beautiful Norfolk Island pines, with their whorls of horizontal branches surmounted by a cross (one of them has here attained over 40 feet in 10 years), we were sorry to hear from the forest officer, that they were dying in several places. By the way, my surmise was correct that the planting baskets we saw being carried from Nanuoya to Nuwara Eliya, were intended for the use of the Forest Department.

Of the attempts at afforestation near the Sanatorium, Mr. P. C. MacMahon, in a letter to a contemporary of yours, does not speak so favourably as he does of a large scheme of improvement for our Mountain Health Resort, which he thus formulates:—

For the purpose of taxation and the working of rules relating to thatched buildings, etc., "Abram Saibo's bridge" is taken as the centre of Nuwara Eliya. All properties—including *forest land* from there to the top of the Rambodde Pass, Black Pool bridge, Mrs. Baker's gate, and the Hewa Eliya bazaars—have to pay assessment, all those points being, in a straight line, over two miles from the bridge. Now, on the North side, Government have conveniently for themselves drawn the Local Board boundary immediately below the whole of their forest, the nearest point of which is not more than a ½ mile from the bridge, while fully 500 acres are within the radius of 1½ miles; consequently, they get off without paying tax, though one of the principal public duties of the town Aratchi and the Nuwara Eliya police is its protection! What I propose is that Government hand over to the town the whole of the forest from the top of the Rambodde Pass to Pedru, and from there to the Lover's Leap falls as their forest reserve and future park, and that the Board gradually improve it by cutting new roads, planting suitable trees, foreign ferns, orchards, &c. In this way Pedru would become, as it should be "part and parcel" of the town, and its noble stretch of forest saved from the systems of "forestry" which one sees along the Nanuoya road, and which is much more calculated than the planting of the tea bush to diminish the attractions of Nuwara Eliya. The road, too, to Pedru could be widened and kept in proper repair—which cannot be done now by the Board as it runs for the greater part of the way through Government forest—and seats placed along it at the principal points of vista where, the weary climber may rest here or his tired limbs and admire the scenery round. Lastly, close to the top of Pedru, a Kandyan pavilion should be built where ladies could hold picnics and shelter be found from the sun and rain. I do not agree with that part of the Report which states that the attractions of Nuwara Eliya are diminishing. Ten years ago the old Resthouse was sufficient to accommodate all the visitors and planters coming to the place; now we have two large Hotels and a Club—all doing fairly well; and, if returns were collected from these, I have no doubt that the flow of visitors is increasing 10 per cent yearly at least. As regards the block which Government failed to get at their price, I think I may state that the "attractions" of Nuwara Eliya will lose nothing by their failing to secure it, and that in the march of progress of the place it will keep pace with those which they have lately purchased—not a very difficult matter, judging by what has been done to and around of Government bungalows here for the last ten years.

In propounding his large scheme of extending the boundaries of the Local Board of Nuwara Eliya so as to include the forested slope and cloud-piercing summit of the loftiest mountain in Ceylon, the Celtic "son-of-a-bear" (for such is the translation of his patronymic) might have been magnanimous enough to have acknowledged that Mr. Armitage's success at the base of Pidurutalagala has been as conspicuous as his failures towards Nanuoya have been regrettably great. But we can all of us imitate Beau Brummel, when speaking of his cravats, in saying, "These are our failures." Let us hope that the dredging operations and water supply works at Nuwara Eliya may be unqualified successes.

Nov. 26th.

I wrote yesterday of an atmosphere surcharged with moisture and of the north-east wind blowing strongly. The result was the commencement of a rain-storm about 1 o'clock, which continued until nightfall. The rain-gauge record is 1·47 inch. This morning rises fine, but with masses of cloud on the eastern horizon.

NO SUCH THING AS WATER POWER—VARIOUS METHODS OF UTILIZING WATER—TURBINES—MOISTURE IN THE AIR—DIFFERENCES OF RAINFALL—WELLS—WATER SUPPLY—A CHANGE TO FINE WEATHER—THE LOFTIEST MOUNTAINS IN CEYLON—MR. NOCK'S EXPERIMENTS WITH POTATOES—GRUB—REMEDY FOR GREEN BUG.

NANUOYA, Nov. 25th.

With reference to possible aid in regard to the Nuwara Eliya Water Supply Works, Mr. W. Tringham has asked me to return a book he was good enough to lend me, and which I have read with very great interest. It is a special volume of the proceedings of the Institute of Civil Engineers, containing papers on the Theory and Practice of Hydro-Mechanics, and dealing with Physiography, Water Supply, Water Motors, Inland Navigation in Europe, Tide and Coast Works, and Forms of Ships. What struck me specially was the proposition, so startling to the popular mind, by the author of the paper on water-motors, that there is, strictly speaking, no such thing as water-power. What we are in the habit of attributing to the impact and weight of descending fluid on waterwheels is due entirely to gravity! However startling such a statement may seem, I suppose the scientific principle is beyond doubt. But les

I should have misapprehended or misstated its effect, I quote the paragraph from Professor Unwin's paper :—"The term water-power is convenient but inaccurate. Strictly speaking there is no such thing as water-power. Whether the water descends on a water-wheel, or actuates a pressure engine in connection with Mr. Ellington's pressure mains, the water is a mere agent of transmission. In the one case the water-wheel is driven by the energy of gravitation, in the other by the energy developed in a steam engine; the water merely transmits the pull of gravity, or the push of the steam engine. In neither case is the water itself the source of the power utilized. As we speak of a steam engine as a heat-motor, so we might speak of most water-motors as gravity-motors," Another principle is thus stated :—"The ordinary source of water-power is a supply of water raised by the sun's heat to a convenient elevation, and falling through natural channels back to the sea," and then follow mathematical proofs. It is fortunate for us in Ceylon, that, in the absence of coal and the increasing scarcity of wood fuel in convenient situations, water thus returning to the sea is so generally present in a form easy of utilization, especially in our hill regions. Professor Unwin states even of Britain, that "No great increase of the price of coal is needed to make water power of much more value than at present. On the other hand if the electrical engineer will make the transmission of energy easier, the importance of water-power would also increase, for one of its greatest defects is that it exists in the localities where nature has placed it, and not in the places where it can be most conveniently used." The author believes that the electrical transmission of water-power would be common, if a diminution of the cost of electrical apparatus took place. On the Continent of Europe and especially in America, water-power is very largely utilized, and at Holyoke, below the rapids of the Connecticut river, water power is supplied to mills at the rate of 20 shillings per horse-power, per annum,—the cheapest manufacturing power in the world. While I believe in *good* turbines where considerable power is required, and skill and intelligence are readily available, we have always had much faith in the common and simple overshot-wheel for ordinary purposes. Two such wheels, equal to 8 or 9 horse-power are sufficient for most tea factories. I again quote Professor Unwin :—"By a bucket water-wheel we can recover the energy corresponding to an unexpended part of the fall; by a pressure engine we can get the energy due to the pressure, and by a turbine we can get the energy due to the velocity. First then there are bucket or cell wheels, in which the water fills the buckets near the top of the fall and descends in contact with the wheel without acceleration. About this class of motors I have time to say very little. They are simple in principle and have a fairly high efficiency. But they are somewhat cumbrous and antiquated machines. On falls above 70 feet they cannot be used. On falls of 20 to 60 feet a turbine is cheaper, and yields an equal efficiency. [Does the world 'cheaper' apply in Ceylon?] On a low fall, if a turbine costs as much, it has, *if well constructed*, a higher efficiency. Still, in one respect a good overshot or high breast wheel is superior to most modern water motors. *Its efficiency is nearly the same with a reduced supply of water as with the full supply.* In this respect many turbines, otherwise excellent, compare very unfavourably with the water-wheel." Compared with steam, water is 500 times heavier, and its incompressibility and inertia are disadvantages. Of an undershot wheel it is remarked, that apart from the losses by the friction and leakage, it utilized less than half the energy of the fall. The Professor does not believe in more than 80 per cent efficiency in turbines and does not regard the American turbines as better than the British. The description of the various classes of turbines sounds like scientific gibberish:—"There are, therefore, outward flow, inward flow, and axial or parallel flow turbines." But Professor Unwin looks on the hope of turbines with greater normal efficiency than 80 per cent as equivalent to the search for the philosopher's stone.—I have noticed Professor Unwin's paper first because of the impression made on me by his denial of the existence of innate power in water, but the first of the series is a very able paper, by Mr. John Evans on Physiography, in which the laws of our atmosphere are analyzed in the spirit of that wonderful passage in the sacred record:—"All the rivers run into the sea, yet the sea is not full; unto the place whence the rivers come, thither they return again." Beyond this alternative movement of moisture from the sea via the atmosphere to the hills and thence back to the sea science has not progressed. Practically the atmosphere is never free of moisture, but neither diffused moisture nor steam is visible until condensed by cold into small particles of water. "The quantity of moisture present in the air varies considerably in different countries and at different seasons. Here in England it is said that the average proportion of water present in the air is about 1½ per cent. When the air at an ordinary temperature is nearly saturated, a slight reduction of heat suffices to make the moisture visible. How often do we not see a mist rising, as it is called, towards sunset, after a bright warm day; and how often have we not seen the morning's mist, and even the clouds at a higher level, gradually disappear under the genial influence of the sun's rays." Evaporation is often almost equivalent to rainfall. At Madras it has amounted to 90 per cent annually; and the hot winds of the equatorial regions get surcharged with moisture, which they deposit mainly at 4,500 feet altitude on mountain sides in India, and Ceylon, the level of greatest deposit in England being at 1,500 feet. "Mountain ranges indeed are the great condensers of atmospheric moisture, and the amount of rainfall in any country is in the main dependent on the position of these ranges, and the prevailing direction of the winds." Whatever local effects forests may have, in modifying climate and preventing floods, my experience is that it neither increases nor diminishes rain, where warm clouds come laden with moisture and there are mountains, no matter how bare, to condense the moisture. "At Sethwaite in Cumberland, the average rainfall is 140 inches.*" At Hunstanton in Norfolk and elsewhere it is little more than 20 inches; so that on an average there is seven times as much rain in one part of England as there is in another. In India the disparity is still greater, between 500 to 600 inches at Cherapunji and 4 or less in places in Sind. Some of your readers may be interested to learn that 1 foot of undrifted snow is the rough equivalent of one inch of rain. There is much of interest about the capacity of different soils to absorb and retain moisture and about subterranean water and its temperature, rising 1 deg. with every 50 feet or so of depth. "It cannot be too often insisted that, in the case of water supply derived from porous soils, it is in the highest degree illusive to depend on averages. The minimum, or, at the best, the lowest average of three

* At Stye, in Cumberland, in 1883, no less than 190 inches fell

successive years, is the utmost on which we can rely." Mr. Evans also denounced the idea that the supply of water in wells was illimitable; it depends on the amount of rainfall absorbed by the soil in which wells are dug. These are only a few points in an elaborate paper. Still more elaborate is that of Dr. Pole, F.R.S., on "Water Supply," in regard to which his experience was extensive. He reminded his brother civil engineers that they owed their origin and also their name, as contradistinguished from architects, to hydraulics,—in the shape of measures to improve the condition of the rivers of North Italy. He characterized water as the most important natural substance known, and the most indispensible for maintaining the present order of things in organic life. He recollected in his boyhood water sold in cans as milk is now. He referred to the Roman aqueduct, and to the first house supply in London in 1582. The New River supply came in 1613, so that the two systems of pumping and gravitation were in force. Then came filtration in 1829. The effects of filtration and oxidizing were described. Moderately hard water like that of London was good, but for washing and manufacturing purposes soft water was required. The lime in hard water can be precipitated by adding more lime, which, seizing the free carbonic acid, forms a carbonate. For ordinary purposes 10 gallons per head water supply ought to suffice, and 5 to 10 more for extraordinary purposes, such as watering gardens &c., would be ample if there were no waste, but say, to meet all demands, 25 gallons per head per diem. *And provision ought always to be made for increased population.* Ordinary reservoirs and irrigation tanks are fully described. The responsibility of engineers was illustrated by the terribly fatal consequences of the bursting of the Dale Dyke reservoir above Sheffield in 1864, when the water rushing with a noise like "hissing thunder" drowned 250 persons. "Gathering grounds" and their yield of water and *occasional failure in years of drought* were described. All the rain that falls cannot be stored. "Part of the water will be restored to the heavens by evaporation; another portion will be absorbed by the vegetation growing on the land; and another portion will percolate through pores and fissures of the earth." Out of a fall of 44 inches, only 30 will be available Interesting accounts are given of the utilization of Loch Katrine and other lakes as suppliers of water to great cities in Britain. The writer, while dwelling on the oxygenizing power of the air on contaminated rivers, pleads powerfully for the direct application of town sewage to the land: as both sanitary and profitable. In some cases, as at Oxford, the water of a river is taken from its saturated bed and not direct from the stream. These notes give but an imperfect idea of the scope and value of Dr. Pole's most able paper.—— Those on the Inland Navigation of Europe, by Sir Chas. A. Hartley; on Tides and Coast Works, by T. Stevenson, and on Forms of Ships, by Sir E. J. Reid, although all very interesting, I must, in view of the length of this communication, refrain from noticing. The volume is well worthy of being read and studied by others than professional men.

NANUOYA, Nov. 27th

The rainstorm of the 25th seems, for the time, to have emptied the lower atmosphere of suspended moisture, for yesterday remained fine, and today commences crisply cold and beautifully bright, with only the ghost of a breeze. Kabaragala which rises over Nawalapitiya shows its characteristic spots distinctly through the Kotmale Gap; and but for masses of haze in the north-east the whole circumference of the horizon would be clear. Of course the north-east monsoon would say:

"Ye have not seen the last of my rainstorms, or me,"

but the dry intervals, which are quite appreciable, are very enjoyable.

Our position here, midway between the valleys of the Nanu and Dimbuldanda oyas, on a spur of the Katupillamana range, the head of which faces Hakgala,

"Like cliffs which have been rent asunder,"

we are as nearly as possible in the centre of a circle formed by the loftiest mountain peaks and ranges of Ceylon. Nearly due north of us is Pidurutalagala, 8,296 feet above sea-level. But for the "trig point" on its summit, the observer would find it difficult to realize that it was higher than its flanking ranges. But there can be no mistake about Kirigalpotta, the second mountain in Ceylon, 7,831 feet altitude, which faces the monarch almost due south. Its white rock face renders Kirigalpotta ever conspicuous; but yesterday, in the clear but not glaring sunlight, after the rain, we saw the sheet rock in a new aspect, reminding us all of one of the minor glaciers we had seen from the summit of the Rigi in Switzerland. The rock was no doubt saturated with moisture, from the heavy rainfall of the previous day, and it positively glittered as it reflected the concentrated rays of the midday sun. Those who have ascended the mountain have stated that the white colour of the rock is due to lichen which covers the surface of the gneiss. But seen with a good glass, which brought out its every precipice and jutting point and ravine, it looked to us like brilliantly white, crystalline quartz scored vertically with strips of dark colour, apparently due to earthy matter carried down by the torrential rains. In any case we are not likely soon to forget the grandeur of this rock glacier, as the sun looked on it so lovingly and with such brilliantly reflected effect, yesterday. Most markedly different in aspect is the mass of of Totapalakanda (7,746 feet) which guards the entrance to the great tableland of Horton Plains, and the sharp point, like a bird's beak, of Kuduhugala (7,607 feet) which stands midway between the two. The pyramidal top of Adam's Peak (7,352 feet) rises, from our point of view, over the keel of the upturned-ship mountain Talankanda (6,137 feet), while our own special mountain, Great Western (7,264 feet), rises close to us, from the Dimbula Valley, over which it presides in massive grandeur. Our circle includes also the Bopatalawa mountains and patanas, Elbedda, Kotagala, Rilagala; and beyond and through gaps, in these we see the more distant ranges of Bogawantalawa, Dikoya, Maskeliya, Dolosbage and the Kelani Valley. In Scotland we are proud of the altitude of Ben Nevis, over 4,400 feet above sea-level. But the bungalow in which I write and look out on no fewer than fifty mountains 5,000 feet to over 8,000 is itself situated 1,400 feet higher up in "the lift" than Scotland's (and Britain's) loftiest mountain.

To descend to Potatoes: Mr. Nock's account of his experiment is most interesting, but he seems to have been exceptionally lucky in not being troubled with black (or brown) grubs. Here they caused us to abandon attempts to grow the prince of edible tubers.—As to getting rid of green bug on coffee, I believe the effectual remedy with all scale insects is an application which will smother mother and offspring; say any coarse flour and any coarse gum or viscid substance mixed with water and laid on so as to cover the insects and stick. But I will write fully the result of large reading on this subject.

SOIL INGREDIENTS.

Iron.—I know of no soil whose contents of ferric oxide would not be more than ample to supply all the needs of vegetation, so far as direct absorption is concerned. Its ascertained percentage rarely falls below 1 per cent. and more commonly ranges from 2 to 5 per cent. A curious fact amply illustrated by analysis is that soils of high ferruginous color do not always contain unusal amounts of the ferric hydrate, the color apparently depending more upon the mode of distribution than on the quantity. This is obvious enough in soil, containing bog ore in visible grains; but in many cases it appears to be a semi-crystalline aggrogation of the substance around particles of soil and sand that hides the tint. The almost universal preference accorded to "red" soils as against gray or whitish lands in the samo soil region, has given riso to the proposition to render the latter classes equal to the first by the addition of iron in some form, even to the use of magnetite sand and iron scraps. It need hardly be said that the true cause of the preference given to red lands is chiefly that the presence of this color indicates good drainage, whereas in the corresponding "white" lands the iron as usually accumulated in the subsoil in the form of bog ore in consequence of stagnation of water, forming a subsoil in which the process of reduction may recur at any time, and in which (as analysis has shown and as might have been anticipated) a large proportion of the phosphoric acid of the soil has been accumulated and locked up. A red soil is a "safe" one and is usually freed from the need of artificial under-drainage. That the color imparted by ferric hydrate favors the absorption of heat is another recommendation of red soils; they are "earlier" than those of white or gray tints. Moreover, as direct determinations show, well-diffused ferric hydrate is powerfully hygroscopic, and adds materially to tho retentiveness of soils for moisture; hence crops on such soils are less liable to suffer from extreme heat than those on less, retentive land. My former determinations of this factor in the soils of Mississippi amply illustrate this point, and California as well as Hawaiian soils [some of the latter contain as much as 39·2 per cent of ferric hydrate, corresponding to 27·4 per cent of metallic iron] confirm the conclusion. A point of practical importance is that doubtless in consequence of reductive processes, soils very rich in ferric hydrate suffer more promptly and severely from lack of drainage than similar soils of low iron percentage.

Phosphoric Acid.—The convicition that has gradually established itself that the practical values of the several calcic phosphates are not nearly as different as was as first assumed, has materially increased the interest of phosphoric acid determination in soils, particularly when these are strongly calcareous, and, therefore, according to the well-known play of affinities, most of the phosphoric acid present will be in the form of a tri-calcic phosphate. There is a good reason why less phosphoric acid in a soil will suffice in soils rich in lime, than in those in which there is no base ready to disputo tho possession as the acid with ferric oxide and alumina which render it relatively insoluble and inert. The very minute amount of phosphates present in the best of soils will render the search of the roots for them very laborious, unless it can be conveyed to them in solution, independently of the acids the roots may exclude. From the discussion of the upland loam soils of the South-western States, I have been led to consider ·05 per cent of P2 O5 as the least amount that can be considered adequate for profitable production in their case, and that tho percentage should rise to ·10 per cent to be satisfactory. But in calcareous, and also in very sandy soils of great depth, less seems a good supply even there, and in California (where nearly all soils are calcareous) the percentage does not very often exceed 10 per cent, even in soils of great present productiveness and durability.

Humus.—Tho determination of humus by Grandeau's method is of the highest interest, as against the extraction with potassic or sodic hydrates, still sometimes recommended. As the latter solvents do not discriminate between the crude, unhumified vegetable matter and the active humus, it misses the main point of interest. What degree of uniformity can be predicted of the composition of humus in virgin soils, I have not had time to determine. Even the physical properties of tho ammoniacal solution obtained vary greatly yet, as in any caso humus must be considered tho repository and store-house of the soils, nitrogen supply, its proportion is of high interest. In the loam (oak) uplands of the cotton States tho percentage of humus seems to range usually between ·70 and ·80 per cent in the poorer sandy pine soils, ·40 to ·50 per cent in the black calcareous prairie soils from 1·20 to 2·80 per cent. The determinations made there are not, perhaps, sufficiently numerous to give fair averages. In California and in the arid region generally the humus percentages as might be foreseen average somewhat lower; lowest in light loam soils of the high *mesas* of Southern California, where ·30 per cent and even less has been found; yet these soils produce well at first, when irrigated. Percentages of ·45 to ·60 of humus are common in good upland loam soils that are neither very calcareous nor highly ferruginous. The "prairie," or black adobe soils usually range from 1·20 to 1·80 per cent, a very few as high as 3·00. On the whole, the highly ferruginous soils are remarkable for large amounts of humus; as in the red soils of foot hills and of the Coast Range. In these latter cases, however, the ammoniacal solution is usually quite light-colored, and only becomes dark on evaporation, doubtless by oxidation. It is pointedly claimed in some of the fruit-growing regions of this State that a too clean cultivation, entirely suppressing the growth of weeds, and thus affording no annual addition of vegetable matter save from the fall of the leaves, tends to injure the production of the orchards. It is readily conceivable that the long, dry and hot season would tend to cause a very rapid oxidation of the humus in the soil well tilled amounting to deprivation when only a very little is originally present. From experience had in green-manuring, it seems that half of 1 per cent (·50) is the minimum of humus desirable in California, and that when less is originally present an increase should be brought about as soon possible. In Western Oregon and on Puget Sound, where tho summer rainfall is very heavy, humus percentages ranging from 3 to 6 per cent are quite common.—*Farmer's Review*.

CEYLON COCOA.

By Dr. A. J. H. Crespi.

One of the most curious features of modern commercial activity is that Nature is, as it were, compelled to improve on her own earlier efforts. Supposing that some much-prized plant is found to do well in a particular region with a climate of given warmth and under certain recognised conditions: the next thing is to find out a region where these conditions are still better, and to introduce tho plant there. This seems to have been done with the cacao tree in Ceylon, and cocoa of superlative excellence has for many years been manufactured from cacao beans imported from that beautiful island. Some brands of Ceylon cocoa have been recently commanding very high prices; this shows what a magnificent field exists in Ceylon for cocoa culture, and that the quality of the cocoa from that island is far above the average of West Indian varieties. The principal peculiarity of the Ceylon brand is its delicate flavour and rich aroma; although when prepared for use its price is not very high, and quite within reach of most incomes. We confidently predict that as it becomes more generally known it will be sold in still larger quantities, and so open up a fresh and most important branch of trade to British enterprise.

Messrs. J. S. Fry and sons, the well-known makers, whose house was founded in 1728, were not slow to recognise tho peculiarly delicious flavour of Ceylon cocoa, and they have accordingly added another luxury to our household beverages in the form of Ceylon chocolate, a speciality that is being much appreciated by connoisseurs.

While on the subject of Ceylon cocoa, we have just been favoured with some of the most recent statistics relating to the consumption of cocoa in England. Although a great authority gives the average consumption as five ounces, per head, it is now ascertained to amount to eight, or, to be more precise, in 1889 it reached 18,464,164 pounds. This is not a large total after all, but marks progress. In 1820, duty was only paid on 267,000 pounds; in 1875, on 9,900,000 pounds. In other words, the consumption has doubled in fourteen years, and should the present rate of progress continue another fourteen or fifteen years, the trade will reach, for the first time, very respectable dimensions.

Considering its fragrance and nutritive properties (for all preparations of cocoa are a true food, and valuable as tissue restorers and force producers), perhaps the small consumption is surprising. For our part, we prefer well-prepared cocoa to all other beverages, while indigestion, which is so frequently caused, or, at any rate, aggravated by the too liberal use of hot tea, does not follow cocoa. The cocoa trade is in a healthy and active state, and the wants of the general public are not likely to be neglected as long as so many leading English firms are busily engaged ministering to the national needs.

One of the best uses to which Ceylon chocolate can be put is to eat it when on tricycling or pedestrian excursions. We have it most convenient, and we believe that cyclists, who are often at a great loss for a portable and palatable food which they can eat without dismounting, will more and more trust to chocolate as their sheet-anchor. Long before our attention had been directed to the subject by a circular we were reading the other day, we had found out the value of dry and satisfying food when many miles from home and pressed for time.—*Hardwicke's Science-Gossip.*

THE SORT OF TEA WE DRINK.—£1 10s 6d, 6s 3d, 3s 8d, and 2s 8¾d—these were the prices per pound, as sold in Mincing-lane, without duty, &c., of the teas that a "Star" man was drinking yesterday. It was in the London establishment of Messrs. Forster, Green, and Co. the big Dublin teamen, that this extravagant spree on tea took place. The primary object of our man's visit was to sample the £1 10s 6d tea, which was sold for £2 to a Leicester tea dealer, who is now retailing it at £3 3s. Some of it was sold in 1oz. packets at 5s per oz. There were only 15lb of this tea in the world, and there may never be such tea again. Previous to this no tea was ever sold in modern times in Mincing-lane at more than 10s or 12s a pound. This £1 10s 6d tea, therefore, has fairly eclipsed everything. It came from the Heathersett estate, Ceylon; and though this and other estates might supply us with such tea regularly, they are not likely to do so, as the cost is too great. In the first place it destroys the tea plants, the leaves being gathered just when they are beginning to sprout, and in the next place every one of these very tiny leaves is gathered by hand. As for the appearance of the tea, it is like very fine cut tobacco of a light colour. To an ordinary observer it doesn't look like tea at all. And as for the taste—well, to the amateur, it is disappointing at first, but after you taste another—say 6s 3d per pound—tea and then go back you begin to think there is something in it, after all. A good many points about the liquor and the leaves and the clouds the milk formed when added were explained by Mr. Holloway, Forster Green's London man, to our representative, who, however, was unable to follow him into the subtle distinctions he drew. One point of public interest he gathered, viz., that in London teatasters infuse the tea exactly six minutes; in Dublin, owing to the difference in the water, the time is eight minutes.—*Home Paper.*

MARIAWATTE AGAIN.—We learn that the yield of the now famous 100 acres of Mariawatta estate, which has given year after year 1,000 lb. or more of made tea per acre, has been, up to the end of last month, 1,100 lb per acre for the current year. This highly satisfactory record presents a hopeful outlook for tea on suitable land, while it is also proof of what high cultivation can do. True, Mariawatte's are not to be got for the asking; but the evidence of the fruits of liberal cultivation should not be lost on proprietors, the majority of whom seem content to believe in the hardiness of the tea plant and to get what they could from it, without giving it back some of the profits, in the hope of a still larger income. We congratulate the proprietors and the superintendent on the continued prosperity of Mariawatte.—*Cor.*, local "Examiner."

DISAPPEARING CINCHONAS.—At the sitting of November 5th of the Paris Society, of Pharmacy M. Landrin, the great dealer in barks, and a good authority on cinchonas, presented a number of specimens from South America. One was a cultivated Bolivia Calisaya in very large pieces containing 3 per cent of quinine. It seems in some countries like Greece and other parts of Southern Europe they will pay 10f. a kilo. for bark in long slices, and offer only 4f. for smaller ones, which are just as rich in alkaloids. M. Landrin also had Guayaquil uncultivated red bark, containing 95 per cent of alkaloids; quills from South America veined like a serpent's skin; and other rare specimens. He added that cinchonas are now becoming scarce in their native country; some sorts will no doubt soon disappear altogether. So, while they are still to be had, it is well to present specimens to the college collections for the benefit of pharmacy students, for which kind attention M. Planchon thanked the donor in the name of the college.—*Chemist and Druggist*, Nov. 8th.

PREPARING FOR THE WINTER MOTH.—Mr. J. Masters writes to the *Evesham Standard* as follows:—"As the season of the year is approaching when the winter moth will be making its appearance, a few hints, by way of reminder to fruit growers, may not be out of place:—

"1. The wingless female moth will be soon making its ascent of the tree, to deposit its eggs for the future brood of caterpillars.

"2. The best proved method of intercepting the moth is to band the trees with cart grease. Buy none unless guaranteed as free from tar. Numbers of young trees have been killed by injurious compounds sold as grease.

"3. Do not use oil in the grease to make it thin. If the daub is stiff, it will last the longer. It is important to have it sticky, and look after it and keep it so, otherwise the moth will creep over it.

"4. If trees are young and the bark is smooth and tender, some grease-proof paper should be tied next to the bark of the tree, and the daub placed on the paper. If trees are matured and the bark is rough, good grease will not injure the tree.

"5. Trees where grease-proof paper is used will not require so much grease, as the paper prevents the bark from absorbing it. If all the trees were banded with paper, it is probable that the saving of the cost of grease would be an equivalent for the cost of paper banding.

"6. Grease may be applied with the hand, or a thin flat piece of wood, or a small brush; in either case put on a thick layer of the grease.

"7. Grease banding should not be delayed after the second week in October, and will require attention until the end of November.

"8. The appearance of the moth may be known by taking out a light in the dusk of the evening when the male moth, if any are present, may be seen. If no male moths are seen, you need not trouble to grease-band the trees.

"9. Do not be discouraged if, after all your pains, some caterpillars are found; when numerous they are not to be exterminated in one season."—*Gardeners' Chronicle.*

CEYLON UPCOUNTRY PLANTING REPORT.

NUTMEG—WEATHER AND COOLIES.

Nov. 18th.

The present concern in the culture of *Nutmegs* gives an interest in their past history. It is like a stale joke referring to the order which came out from home, when mace was at a very high figure, that more mace was to be grown and less nutmeg. But is it history? Was such an order ever given, and is it not more likely that it was made in the East and fathered on the west? To be sure it is like the mistake of a smart man at home,—these fellows who know everything, and are prepared to advise the world: but this of course would only give it all the morepoint.

That the nutmeg does flourish in history, is undoubted, for I lighted on a reference to it while reading Leckey's "History of England," the other day. It is instanced in illustration of the extreme multiplicity and complexity of duties which obtained in England before Pitt took the matter in hand and brought order out of confusion. "It was noticed," says Leckey, "by one of Pitt's best officials that so trifling an article as a pound of nutmegs paid, or ought to have paid, nine different duties." Growers of nutmegs may rejoice that in these days all this is changed.

Our present weather is just perfection for tea flush, and most estates are strained to keep up with it: everything else too is ripening, and these months are certainly the big harvest of the year, and when a place cultivates more than one product, it is kept busy.

Coolies on the whole are about enough for the ordinary wants—a little pressure does no one any harm, keeping us from going to sleep, and waking into life faculties which otherwise might be rusting.

The rain however is still very short of want it should be, to be made up, no doubt, later on.

PEPPERCORN.

THEFT OF CACAO (AND POSSESSION OF SAME BY A PRIEST) FROM THE WARIAPOLA ESTATE.

IN THE POLICE COURT OF MATALE.

No. 5,611, October 27th.

Robert S. Fraser of the Wariapola estate *vs* Piyadessa Unnanse of Tibbotumulla.

A CACAO PLANTER'S EXPERIENCE.

A. G. K. Borron sworn, stated: That he has been a planter for twenty-eight years, eight of which he had a good deal of experience in cacao. He stated that the accused begged that Court to proceed to the pansala garden, when the Magistrate promised to visit the spot the next moruing, which he did on the 31st ult. with Mr. Faulkner of the Suduganga estate. This gentleman also spoke of the difference of the seeds of the different varieties and of the trees on the Wariapola estate and the pansala garden.—The following is the

JUDGMENT.

There can be no manner of doubt that the cacao seeds found in the possession of the accused were seeds of the Forestero variety of cacao. That has been established upon evidence that is unexceptionable and satisfactory. Mr. Fraser's evidence and that of Mr. Borron place this question beyond all doubt, and it is further proved that the seeds found in the possession of the accused were all immature and unripe. That these were taken from pods stolen from Wariapola estate there can be no doubt, upon the evidence in this case and upon what I myself saw on visiting that portion of the estate which adjoins the accused's pansala garden. Not that this item of proof is necessary under the provisions of section 2 of the Ordinance No. 22 of 1886, which constitute the bare possession of unripe fruit of the cacao an offence, but it is always most satisfactory to find that the marks of recent stripping on the trees from which fruit have been stolen make it all the more clear, that the unaccounted for possession of the seeds is an indication that the seeds have come from pods stolen from the stripped trees. The prompt action taken by Mr. Fraser and his men led to the discovery of unripe seeds in the possession of the accused, for which possession the account given by the accused is utterly untrue. He stated explicitly that these pods had been gathered from his own trees that very morning.—Mr. Fraser very properly asked him to show the trees from which they had been gathered, and he showed to Mr. Fraser what he showed me when I visited the garden at his request,—trees of the criollo variety which under no circumstances could have yielded seeds of the Forestero variety. I have had the advantage of seeing the pansala garden, and it is only too obvious that the seeds found in the accused's possession could not have been the produce of those trees. I carefully examined the trees in that gardenand except three or four plants which had borne no fruit, and two of which were only just beginning to bear, there were no other Forestero trees from which fruit could possibly have been gathered that morning. The clumsy attempt of the little stripling priest to show me a fruit alleged by him to have been taken from a tree which five minutes before I had examined in his absence, and on which I found no such fruit or anything worthy the name of fruit, was soon traced to what was obviously a theft committed by him from one of Mr. Fraser's trees, while we were walking about the pansala garden,—on the other side of which were Mr. Fraser's trees separated from our view by a lantana hedge and other trees. This only indicates the facility with which thefts are committed of fruit belonging to Mr. Fraser's estate.

It has been urged for the defence that others may have committed the theft. It is not necessary to entertain the thought of such a contingency, because the priest has not put that forward, but has stated that the seeds found in his possession were the produce of fruit picked by him from his own trees. That he stated to Mr. Fraser and the same statement he made to me. It was further urged that he was a blind old decrepit man. That he was old and somewhat feeble, I could see easily, but he certainly was not blind, nor anything like decrepit. I daresay he has put on the semblance of decrepitude to avoid the consequence of his guilt. No doubt his age entitles him to some consideration, and in meting out the punishment due to his case, I have taken that into consideration. Had he been a younger man I should have given him rigorous imprisonment as a substantive punishment.

The enormous ravages there are being committed by natives in the neigbourhood of coffee and cacao estates indicate well organized and systematic robbery of produce. Not only are the fruits stolen from the trees, but the bearing capabilities of the trees are sensibly diminshed by the ruthless stripping of the fruits and the tearing away of the fruiting eyes of the trees.

I find the accused guilty and sentence him to pay a fine of fifty rupees and in default of payment to be kept at rigorous imprisonment for a term of three months.

(Signed) J. H. EATON, P.M.

TIMBER TREES.—Mr. A. Mendis Senanayake, Arachchi (he ought long ago to have been made Muhandiram) of Moratuwa, has been carrying on the list of the Principal Timber Trees in Ceylon, first drawn up by his father, Mudaliyar Mendis. The copy that has been sent us is very nicely printed with 156 separate trees with Sinhalese and botanical names (in some cases Tamil also) and a variety of information such as uses, average size of log, &c. Planters in need of such a list can, in a few days, secure copies on application to the *Observer* bookstore. It behoves Government Agent Dawson to look out worthy industrious Sinhalese men such as Mr. A. Mendis Senanayake—the respected son of a worthy father—for higher honours.

REVISED ESTIMATE OF INDIAN TEA CROP—CURRENT SEASON.

The Indian Tea Association has favored us (Messrs. Wm. Moran & Co.) with the following, giving the revised estimate for the current season:—

"In their circular of the 28th April last the General Committee gave an estimate of the out-turn of the present season's crop of Indian Tea based upon the following figures which they had been able to collect:—

Original Estimate of Crop of 1890.

	lb.
Assam	48,295,344
Cachar and Sylhet	33,385,680
Darjeeling, Terai and Dooars ..	22,817,270
Chittagong and Chota-Nagpore ..	1,514,800
Dehra Dun, Kumaon and Kangra ..	4,500,000
Private and Native gardens	4,500,000
	115,013,094

"From the figures which have since been obtained a revised estimate has been prepard, based upon actual results to the 30th Sept., as follows:—

	Manufactured to 30th Sept. 1889. lbs.	Manufactured to 30th Sept. 1890. lbs.
Assam	31,680,136	32,923,787
Cachar and Sylhet ..	20,736,051	23,815,670
Darjeeling, Terai and Dooars	1 62,384,91	15,291,811
Chittagong and Chota-Nagpore	1,049,419	1,221,080
	69,700,497	73,252,348

Revised Estimate of Crop of 1890.

Assam	45,001,072
Cachar and Sylhet	34,477,770
Darjeeling, Terai and Dooars ..	21,070,453
Chittagong and Chota-Nagpore ..	1,768,716
Dehra Dun, Kumaon and Kangra ..	4,500.000
Private and Native gardens.. ..	4,000,000
	110,818,011

"The exports to Australia, America and other places for the past season amounted to 5,388,560 lb., and if this quantity, plus 10 per cent, together with the requirements of Northern India now calculated at 500,000 lb. be deducted from the revised estimate, there will remain about 104½ million lb. for shipment to Great Britain during the season of 1890-91 against 98 million lb. shipped there in 1889-90."

CINNAMON AND COCONUTS: PLANTING REPORT.

KADIRANA, 24th Nov.—From the 26th October to the 15th inst., 19·87 inches of rain have fallen in this district, so that wells and springs are replenished, and all outward appearances of the late drought have disappeared, though its consequences will be felt for more than a year to come. This rain, and the fine weather we have had for over a week past, have matured the "bud" there was on the bushes, and no doubt those who intend cutting for the "punchi mosama" will soon begin work. All Mr. Tudor Rajapakse's cinnamon estates in this district are to be leased, and as in the conditions there is no clause binding the lessee to carry out the arrangement not to scrape chips, a large quantity of these will be thrown upon the market which, in conjunction with the distrust and suspicion of bad faith already abroad, will probably lead to the cancelling of the agreement upon honour, which has still a year to run.

"LYSOL" is a new disinfectant which is prepared by emulsifying carbolic acid with ordinary fat or resin soap, and the tar acid is incorporated with the soap at the moment of saponification. It is said to be more active than carbolic acid by itself.—*Globe.*

POTATO CULTIVATION IN THE HILL COUNTRY OF CEYLON.

Mr. Nock of Hakgala Gardens is good enough to give us the following account of his recent experience—just to show that potatoes can be profitably grown on the hills of Ceylon, if good sorts and good seed tubers are used:—

"On 22nd of Aug. last I planted, in good friable soil, 48 tubers of each of the three kinds named below, and I lifted them yesterday with the following results:—

"CHESWICK FAVOURITE.—From 48 sets the produce was 482 tubers weighing 85 pounds. The twelve largest weighed 7 pounds and the largest single tuber 11½ ounces.

"IMPERATOR.—From 48 sets, 357 tubers were produced weighing 75 pounds. The twelve largest weighed 8 pounds and the largest single tuber 12 ounces.

"ADIRONDACK.—48 sets produced 457 tubers weighing 65 pounds. The 12 largest tubers weighed 6 pounds and the largest tuber 11 ounces.

"Every tuber of Cheswick Favourite and Imperator were quite sound. There were about 12 or 15 tubers of Adirondack that were diseased, but these were from a few roots at the bottom of the row where the soil was a little damper.

"A more even lot of tubers I never lifted and I attribute this evenness chiefly to the way the sets were prepared for planting, but in some measure it may be due to the very favourable weather during the time of growth.

"Every set was a whole tuber, and the average weight used was about 2 ounces; these tubers had been previously laid out in a room, exposed to the light, and occasionally turned—which had caused the eyes to send out very sturdy sprouts and when these were about one inch long they were planted in rows 2 feet apart, the sets being 1 foot apart in the rows. The manure used was a little bone dust, and wood ashes with a sprinkling of lime. The only other attention they received was to keep them free from weeds and to earth them up well.

"They were in the ground only 84 days and during that time 12·70 inches of rain was registered. This fell on 47 days, but on only 10 days did ·50 or more fall, On 27 days the fall was ·15 or less, so that this sort of weather just suited them.

"This is the fourth crop from a few tubers I brought on with me from Worcestershire, exactly two years ago, and I think this proves that with careful selection and preparation of "seed" tubers, that the potato improves in this locality, instead of deteriorating as I believe is generally supposed.

"Our rainfall for this month to date is only ·50."

THE CEYLON AMERICAN TEA COMPANY.

The following is an extract from a letter from Mr. Stretch of Messrs. Darley, Butler & Co., dated London, 13th Nov.:—

In writing last week about the new Ceylon Planters' Tea Co. I had hardly got hold of my facts. Since then I have copy of the prospectus and full details of the proposed arrangements. The point which shareholders, or intending shareholders will require to be informed upon is how a dividend is to be paid on $1,000.000 with a working capital of only only $200,000. The shares are divided as follows:

Working capital	10,000 shares	at	$20	$200,000
To old Co.	12,000	do	do	240,000
To Promoters	28,000	do	do	560,000
	50,000 shares	at	$20	$1,000,000

I suppose when the Company is in full working order the working capital may be turned over 3 times a year so that the turnover would be $600,000. It will require 10 per cent profit on that to pay 6 per cent on the total capital. What are the prospects of earning such a profit? I hear that the tea sold in the States is rarely sold under $1 per lb

which of course would give a much larger profit, but in order to sell the quantity required they must reduce the price, I imagine. If it is possible to get agents in all the towns that it is desired to be represented in, a very small quantity sold annually by each agent will do it.

November 24th.—The more I look at the scheme of this Company the less objectionable it seems. I got so far as that it required to earn 10 per cent on its turnover to pay 6 per cent on its total capital when I last wrote to you I think. I have now got a step further, viz: that inasmuch as a man gets 2 shares for *one*, 6 per cent will be equal to 12 per cent to him and therefore 5 per cent on the turnover will yield equal to 6 per cent making a very feasible and workable thing of it. I have no doubt the thing is in the hands of respectable people and will with push and energy prove success." We hear from Messrs. Wattson & Farr this morning that they are successful in getting some good Agents and think the co-operative scheme will work very well.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

London, Nov. 6th.

CINCHONA.—At the periodical auctions held on Tuesday a moderate quantity of bark was offered, the catalogues comprising:—

	Packages		Packages	
Ceylon bark	1,675	of which	1,432	were sold
East Indian bark	.. 322	do	268	do
Java bark	 42	do	42	do
S. American bark	 354	do	196	do
Total	2,393	do	1,938	do

It will, therefore, be seen that of the Eastern barks offered over 85 per cent were disposed of, while the proportion of bark sold to the total offered was about 1 per cent. The auctions opened with fairly steady competition, but gradually the demand slackened, and holders occasionally accepted a slight decline on the previous rates for manufacturing barks. The tone of the market was barely steady, and the unit cannot be quoted higher than from 1½d to 1⅝d per lb. Druggists' barks, however, particularly red shavings, were very well competed for and brought full prices. The assortment of bark was a poor one, especially that of Ceylon bark, ordinary Succirubra chips and root making up the bulk of the supply. But there were several parcels of good strong Crown bark imported from Bombay.

The prices were evidently considered low enough by some speculators to tempt them to secure a small quantity, and about 9 tons were thus bought through a firm of brokers. It should be well understood that the mere weight of bark purchased affords no guide whatever to the quinine yield represented by it, firms who by a small quantity of bark by weight frequently taking the richest lots and *vice versa.*

QUININE.—The point reached this week is the lowest which has been known for some months. At the close of last week about 20,000 oz of German bulk in the second-hand sold at 1s per oz., and the week opened with further sellers at that figure. Another parcel of 20,000 oz subsequently sold at 11⅞d per oz while for 10,000 February and April delivery 12½d was accepted; since then, however, the market has somewhat improved, and it closes today with buyers at 1s per oz., but no sellers at that figure. The result of the Amsterdam bark sales may, however, affect the position of the article again. We hear of a sale of 5,000 oz second-hand German today at 12½d per oz for February.

THE ARTIFICIAL PRODUCTION OF SUGARS.

Barely have sixty-two years elapsed since the great German chemist Wöhler prepared urea artificially. Up to that date the opinion was generally held that all chemical compounds which are found in the bodies of animals or plants could not be made artificially. They, it was said, are the results of vital action, and the endeavour to prepare them in the laboratory was considered as impossible, and almost as wicked as to try to manufacture an homunculus. Wöhler's discovery at once dissipated that false notion and since his time the labours of chemists have resulted in the manufacture of hundreds of compounds formerly only obtainable by natural processes carried on in living organisms. The latest and perhaps the most remarkable of these triumphs of synthetic chemistry has just been made known to us. The group of bodies termed by chemists the carbo-hydrates—because they are composed of carbon united with oxygen and hydrogen in the proportion in which those two elements combine to form water—contain the well-known series of sugars, gums, and starches. The chemical composition of these bodies has long been known, but a knowledge of their constitution—that is, the mode in which their several constituent parts are put together—has only recently been acquired. It is clear that until we know what is the structure of a complicated arrangement of atoms, it is useless to attempt to build up that arrangement. We must have a plan of the house before we can build it. Such a plan of the structure of the sugars is now in our possession, and their artificial production has therefore become a possibility, and in the hands of a distinguished German chemist, Professor Emil Fischer, of Würzburg, that possibility has just been converted into a reality. The various steps by which this great result has been accomplished can only be explained and appreciated by those familiar with the intricacies of modern organic chemistry. But the importance of the discovery is patent to all. The group of carbo-hydrates (sugar and starch) are, next to the albuminoids (eggs and flesh), the most important material needed to support animal life. Indeed, the vegetarians would, and perhaps rightly, place them first. Can we look forward to a time when the chemist will manufacture our sugar, when the sugar-cane and the beet-root will cease to be planted, because their products can be more cheaply manufactured from coal or wood? Results apparently as improbable have happened. Who could have foreseen that the thousands of acres upon which the madder-plant grew in France and Turkey would now yield corn and hay, because it was found that the dye formerly obtained from that plant can be more cheaply made from coal-tar? So, too, indigo has been artificially obtained, and who can tell that a recent new process for its manufacture may not prove fatal to the indigo planter? That the process of making sugar artificially is now too expensive to compete with Nature is, therefore, no proof that cheaper processes will not be discovered; indeed, that this will happen may be taken for granted. So that, looking back to the enormous strides which chemistry has made during the last half-century, and seeing what has already been accomplished, he would be a bold man who should dare to define the limits of her power, or to declare that our grandchildren may not use artificial sugar to sweeten their tea, and that Jamaica may know the sugar-cane no more. From a biological point of view, too, this discovery is of deep interest and importance. We know nothing, or as good as nothing, of the processes by which sugar is produced in the plant, nor how this sugar is transformed into starch, fat, and woody fibre. Are these results due to a special vital force, or does this expression merely serve as a cloak for our ignorance, and will careful investigation show that these substances are built up in the plant by methods similar to those which are now successfully employed in our laboratories? That this latter is the true view is the belief of the chemist, and nearer towards that end the discovery of Fischer has undoubtedly brought us.

An interested physiological question now presents itself. Supposing that these artificial sugars were to become articles of common diet, what will be their effect on the animal economy? That two chemical compounds may possess the same composition, and even the same chemical arrangement of their parts, and yet act differently from a physiological point of view, is well-known. And still more likely will this be if the artificial sugar differs in composition from the natural one. The blood and tissue which are formed from the artificial carbo-hydrates may differ from those which are the results of the assimilation of the natural sugars. If the pig and the goose were fattened on an artificial diet, their fat might differ from that which

they now form; and the bee fed on manufactured sugar might yield another kind of wax.

But we may go one step further. We know that plants not only convert sugar into fat, starch, and woody fibre, but that in presence of certain minute organisms they form nitrogenous or albuminoid compounds such as the gluten of wheat. Supposing it were possible to feed plants or these minute organisms on artificial sugar, differing in their properties from their ordinary food, it might force the plant to manufacture a new kind of albumen. And then what new structures might not be expected to start up from the use of the new building material?

Chemistry would then, for the first time, bring her potent influence to bear upon the structure of organised beings, and the changes of form which would result might prove to be of the strangest and most unexpected kind—changes far more remarkable than all those, singular and far-reaching though they be, caused by processes of artificial selection or of cross-breeding. The revelations of science have already outstripped the marvellous. What yet remains concealed in her bosom defies the wit of man to foretell. H. E. ROSCOE.

—*The Speaker.*

SEWAGE AND SUGAR.

Under this heading the *Pall Mall* has a paragraph which ought to promote a "fierce boom" as the writer says in Ceylon tea:—

Dr. Richardson told a horrid story on Saturday night in his lecture on the progress of sanitary science. Years ago, he said, the sewage of London, or part of it, used to be taken to Jamaica in barrels to manure the sugar gardens. The exporters of sewage thought it would be a pity to waste their barrels, or to bring them back empty; so the self same barrels were filled with a return cargo of raw sugar. The story needs no comment, but it suggests two queries; first, whether we get rid of our sewage in a very much better way now, by turning it wholesale into the river; and, secondly, whether there may not be today many products of origin as tainted as was that of Jamaica sugar. Travellers for the interior of China tell very nasty tales about the personal habits of the coolies who tread the tea intended for the use of the "foreign devils." Doubtless boiling water removes a multitude of evils, but it does not kill imagination; and if the confiding British citizen could see the feet beneath which his Chinese half-pound had passed, there would be a fierce booms in "Indias" and "Ceylons."

A NEW CEYLON PROJECT.

Under the title of the Ceylon and Oriental Investment Corporation, Limited, a company has been registered, with a capital of £250,000, in 49,950 ordinary shares of £5 and 250 founders' shares of £1 each. Its object is to acquire, by purchase or otherwise, and to lend or invest money at interest upon the security of lands of freehold, leasehold, or other tenure, stock, crops, plantations, tea gardens, buildings, mills, machinery and plants, mines, mining claims and rights, and mineral lands generally; documents of title, warrants merchandise, and other property in Ceylon India or elsewhere; to carry on business as planters of tea, coffee, rice, cinchona, tobacco, or other produce. The subscribers who take one share each are:—G. G. Arbuthnot, 144, Winchester House, E.C.; H. C. Smith, Hay's Wharf, S.E.; C. E. Johnston, 59, Cadogan Square, S. W.; J. H. Thring, Alford Castle, Carey, Somerset; H. A. Hancock, 28 Mincing Lane; A. Zimmern, 51, Lime Street, E.C.; S. H. Goodhart, 22 and 23, Great Tower Street, E.C. There shall not be less than three nor more than eight directors. The first are George G. Arbuthnot, Hamilton A. Hancock, Cyril E. Johnston, Charles A. Reiss, and J. Huntley Thring. Qualification, £500. Remuneration, £1,000, divisible.—*H. and C. Mail.*

CEYLON AND ITS PRODUCTS.

TROPICAL AGRICULTURE.

I have more than once, before now, favourably noticed the very admirably compiled "Handbook of Ceylon," periodically issued from the Colombo Press, by Messrs. A. M. and J. Ferguson; and the volume now before me for 1890 91 is in wealth of matter, arrangement, and general get-up, superior to any of its predecessors.

There are few colonies so fortunate in their chronicler. Certainly no tropical colony in the world is so well furnished with a complete directory, probably because no other colony has been furnished with such a Ferguson. For full 30 years the work has made its appearance at stated periods. At first (in 1859) a tiny booklet of 100 leaves modestly apologising for its "thickness"! Now, without a blush, its red and gold covers firmly clasp over 1,400 pages of closely-printed matter. And such matter! The carefully accumulated cream of 30 years' brain-work. The agricultural, financial, and statistical experience of a lifetime; all pertaining to the most successful of our Crown colonies, and contributing by its accurate information, not a little to the continued prosperity of this our leading Crown colony. Every public library, and every individual in any way connected with the Spicy isle, ought to possess a copy of this comprehensive work.

But of even more interest to the general reader will be the complete volume for 1889-90 of the "Tropical Agriculturist," a copy of which has also reached me from the same press. This is, as far as I am aware, an entirely unique work. For while in Europe our press teems with "Farmer's Journals" and works on the agriculture and horticulture of our temperate regions, this is the only periodical devoted exclusively to Tropical products; a field at once so absorbing, interesting, and extensive, that the marvel is that its special advocate and chronicle has been so long in coming. Perhaps no man so admirably fitted for the work of editing such a periodical had before taken root in the Tropics. His keen observation, restless energy, and facility for extracting the essence of all that is known of every conceivable tropical product, gave John Ferguson a peculiar fitness for the post—a fitness which he labours so assiduously to improve.

Here will be found from time to time all that is interesting to planters, and all that pertains to the rich and varied products of tropical and semi-tropical lands, their cultivation and preparation for the market, where and how to sell or buy, and how best to use at home. From New Guinea to Peru every important scrap of information is gathered and husbanded, while the East and West Indies, Africa and Brazil, are ransacked for new, or suitable soil, in which to grow the old luxuries or necessaries of modern life. Not many years ago the preparation of so common an article as tea was enveloped in mystery—now China itself has been turned inside out. A dozen years ago the cultivation of such precious plants as coco, cacao, cinchona, cubebs, cardamoms, &c., was little known; the varied preparations from the palm tree were little heard of, and the magnificent flora of these warm humid regions sealed up from the general reader. Now all is here treated in a manner at once attractive to the million, useful to the man of business, and deeply interesting to the scientist. Ceylon, indeed, is now coming to be recognised as the experimental garden, or model from *par excellence* for the tropics; and its lot may be to bring about many marvellous changes as to the source of our supplies. Twelve years ago, for instance, not an ounce of chocolate had ever been shipped from the East. True, our good old friend, Mr. R. B. Tytler, had for years his pet little chocolate field, which he liked to show to his special friends, and joke over the possible fortune of the future. And many a fair castle have I heard him build as the fragrant smoke rose like incense from his lips! But it was not till the collapse of coffee that he thought seriously of extending the cultivation of cacao and acquiring the necessary knowledge of its preparation. R. B. T. did nothing by halves. "I'm off to Trinidad to see how it's done,"

he wrote to me on 30th November, 1879, and three months later I find him writing—"Back again, full of acquired valuable information; damages, £200; well worth it. My next move will be to the East, to show them how to do it. It is important to give the new product a correct start on entering the market, and getting a good name from the first. *Lanka will owe me not a little, I assure you.*" Two years more, and my friend writes his last from Ceylon. "O for a crack with you! The coffee is played out, but the chocolate is magnificent, 800 acres planted on Palli, first planted bearing 8 cwts. per acre—115s 6d in London! (Trinidad only realising at same sale 90s.) Clear profit, 100s per cwt."

Mr. Tytler's estates continued to prosper, and are now among the best cocoa estates in the world; realising probaly from £7,000 to £8,000 clear profit a year; but the full tide of prosperity came, alas! too late for my good old familiar friend. "Oh for the dream-days back again" he was wont to exclaim—"*They* were glorious *realities*—now it is the dregs, the apples of Sodom. Foggy neeps!

The annual export of cocoa from Ceylon has now reached 2,000,000 lb., paying the producer handsomely; but a new generation of planters has arisen who know not their benefactor. Meanwhile, it is curious to note that our friends in the West Indies are about to send a commissioner all the way to Ceylon to see "how the thing is done." Still more curious and startling is the case of tea, the export of which has now risen to over 40,000,000 lb., and in a few years more is estimated to reach 70,000,000; while it is positively painful to read the lamentations of Chinamen over their decaying industry. Albeit, John has, as usual, had but scant justice in this tea business, handicapped as he is with a heavy export duty—a duty, by the way, for years collected by British officials to pay for our uninvited visit to Pekin. In other words, the Chinese have paid their so-called indemnities in tea. Is it any wonder, under the circumstances, that the China leaf does not improve in quality or cleanliness.

COLONIENSIS.

—*Aberdeen Free Press*, Oct. 11th.

OUR TEA CROPS AND ESTIMATES.

It is well to put on record once more in an unmistakable way, how the figures stand in reference to our Tea Crops, or rather Shipments, and Estimates.—For the old Commercial Year 1889-90 (1st Oct. 1889 to 30th Sept. 1890) Messrs. Rutherford and Scovell estimated total shipments

equal to	43,000,000 lb.
The *Ceylon Observer* estimated ...	42,000,000 „
Actual result	42,994,000 „

For the current Commercial Year (1890-91 estimates are as follows:—

Ceylon Observer's ...	51,000,000 lb.
Mr. A. E. Scovell's ...	52,000,000 lb.

For the Calendar Year 1891,—

Mr. H. K. Rutherford estimates:—52,750,000 lb.

This will, we believe, prove if anything below the mark, and our own inclination will be to estimate for 1891's shipments, at a million more,—

Ceylon Observer for 1891,—53,750,000

But we shall be better able to judge at the end of the present year. If, as we expect, the total shipments for 1890 will not be less than 45,000,000 or an increase of close on 11 million lb. on 1889, we should expect a rise of not less than 9 millions lb. in 1891.

But of more interest to our home readers is it to mention that the total shipments of Ceylon Tea to the United Kingdom in 1890 are likely to be about 42½ million lb. against 104½ million lb. from India in season 1890-91. In 1891, Ceylon will probably send close on 50 million lb. to the United Kingdom, unless a big trade direct between Colombo and New York, Colombo and Odessa set in, as well as a steady increase in the export to Australasia. In that case we may have less than 50 million lb. to send to London.

NOTES FROM CALIFORNIA.

Our readers will find much that is interesting in the following letter from a former Ceylon planter who has now settled down to cultivate "bean land" in far-off California:—

Rancho Santa Katrina, Saticoy,
Ventura County, California, Sept. 9th.

It is a long cry from here to Ceylon, but I have no doubt the Postal Union is capable of carrying my good wishes for yourself and family and for the "Old Rag," for a perusal of which my soul panteth sometimes, to read of old friends and old familiar doings.

You will have doubtless heard of my moving here. I arrived at New York on the 18th June, and making Sacramento on the 25th of that month I made a stay of a few days in Northern California in the lovely valley of Loomis of the Citrus Colony, which by-the-bye is largely made up of English gentlemen. I was greatly pressed to stay, and was very much tempted to do so, as much for the proximity to the railway, the capital town, and fertility of soil as the social attractions but did not; I was afraid that though handsome returns could be expected I was hardly strong enough for the labour required.

The colony being the youngest in California, hired labour was hard to get and very expensive. What do you say to strawberries paying there at the rate of $1,800 per acre! A man could only cultivate a few acres at a time, as you may suppose, the ground requiring constant cultivation and irrigation.

A truly lovely country nature-planted with immense live oaks and waving with natural grasses and wild oats self-sown. I had of course to rough it, sleeping double and washing outside, sharing the basin with half-a-dozen rough quarry-men, who slept in the grounds outside the express office (my hotel) in a tent. Having enough of that I took ticket for this country, and was staying some time with an old Ceylon friend, before moving into my own quarters, and an old acquaintance of yours of the name of J. G. Morrison who is married and settled here. The address heading of my letter is my own ranch of 40 acres of bean land. This land lies above the mouth of the Santa Clara river facing the grand Pacific, with the barrier islands of Auacapa (see map) and Santa Cruz on the right and the Guadalasca range across the river to the left—with Red Hill mountain standing grand and bold in the clear soft blue of the sky.

My attention at present is largely engaged in the erection of a house and windmill,* having just completed the boring of a 264 feet well. All details of daily life have to be done by oneself,—cooking, grooming of the horses, washing, dusting &c.; monotonous, continuous work but not too hard. The out-door work all can be done by one not too strong and who like myself has never done hard manual work before, with perhaps the one exception of ploughing—the original ploughing of the land. But the neighbouring farmers will do at a day's pay—generally from $1·50 to $2·00. I like the life, the country and the people (now that I know something of them) greatly and would not exchange with anyone. It has a glorious climate and room for 30,000,000 of people where there is not but 1¼ million. I say, come one, come all. There is no need of American naturalization, one can stick to the old flag and yet take part in Brother Jonathan's dollars—pronounced *darl*-lers.

There is much to interest in this, one of the oldest historical spots on American soil. It was here Padre Junipero first landed for the conversion of the Indians, and finding a quiet sea, a fair harbour, and a populous, gentle, kindly people to welcome him, called it Buena Ventura—"good venture"—and here he erected the quaint old adobe (sun-dried brick) church which still stands in the main street of the town of Ventura (five miles for Santa Katrina)—enshrining (surrounded as it is with modern wooden buildings of every conceivable American bad-taste) in its somewhat gloomy interior

*Windmill power ought surely to be largely utilized in Ceylon.—ED. *T. A.*

a life-sized figure of the Saviour, too realistic in its gory details but with an old-world pathetic beauty yet about it. The audience consists entirely of the Spanish-Portuguese-Italian community, and comprising a number of half-breeds. The Indians pure have long been extinct. The Padre is a curiosity in himself, has been many years here, and wears a beautiful beard down to his waist. He is said to be the only R. C. minister permitted to do so in America and required the Pope's dispensation. The old gentleman used to suffer from severe catarrh, and something warm about his throat was the only cure. There is lying all about me a fund of interesting information and gossip for half a hundred letters and which I shall be pleased to repeat, from time to time, to the readers of the *Ceylon Observer*.

REPORT ON THE PROGRESS AND CONDITION OF THE BOTANIC GARDEN, ADELAIDE, SOUTH AUSTRAIA, DURING THE YEAR 1889.

BY R. SCHOMBURGK, DR. PHIL., DIRECTOR.

Dr. Schomburgk, although verging on fourscore, is still at his post in charge of the beautiful gardens at Adelaide, and has issued his report for last year. From this document we quote as follows:—

The rainfall in and about Adelaide during 1889 was the most copious on record, as may be seen from the tables of the Government Astronomer, an extract from which is subjoined. The largest quantities of rain fell in the months of April, May, June, August. and September.*

The atmospheric conditions which prevailed during the summer months were abnormal, and this was the case during January and February also. Indeed, during these two months some of the most trying weather ever known was experienced. There were few hot winds, and the thermometer ranged between 90° and 106° Fahr. in the shade and from 150° to 160° in the sun. The quantity of moisture in the air was unusually great, and it rendered the climate for the time being as uncomfortable and as distressing as it is in Brisbane, and, at times, in Sydney. The beneficial effects of the season have extended over the whole colony, and have greatly tended to promote the progress of agricultural and pastoral enterprises, but more especially of the former, which sorely needed some stimulus after the bad effects of several previous dry seasons. The wheat crops in some districts would have reached 15 and 20 bushels per acre, or in many cases even more, but for the appearance of that scourge "red rust," which, in many places, destroyed whole crops, and in consequence the average wheat yield was only 7 bushels per acre.

The fruit crop was a fair average one, and the fruit itself generally of fair size and good flavour. The produce of the vineyards has also been satisfactory, both as to quantity and quality. In the Botanic Gardens the flower parterres, borders, and carpet beds have desplayed a wonderful variety of colors, produced by the different flowers which flourished during the summer months, such as Amaranths, Zinnias, Portulacas, Tagetes, &c. Their appearance generally has been superior to anything previously seen in the garden, and has elicited the warmest expressions of admiration from the visitors to the garden. The roses, however, suffered greatly from the rain, and from the scorching sun in November and December, which destroyed the small flower buds, so that last year was not a favourable one for the development of the large collection of roses.

New Fodder Plant.—The wood lathyrus—*Lathyrus sylvestris*, Linn.—No forage plant has ever created so much surprise amongst agriculturists in Germany as the wood lathyrus. Although indigenous in both England and Germany, its valuable properties—long unknown—have only recently been discovered. The *Register* newspaper was the first to call attention to the plant by reproducing and extract from the *North British Agriculturist*, which had been forwarded by Mr. J. Christison, of Clare, who expressed the opinion that it merited the attention of South Australian farmers. The *Register* truly observes—"That farmers may be pardoned for hearing with a feeling of caution, merging with distrust, of some wonderful new fodder plant, which will grow enormous and most profitable crops on even the poorest soils, and which seems able to grow luxuriantly in any climate. But the facts that have just come to hand should go far to convince even the most sceptical that a most valuable plant is now being placed at the service of Agriculturists." It is further said that—"The plant belongs to the order of *Leguminosæ*, and, as such, is able to forage for itself in regard to nitrogen, of which it obtains abundant supplies either from the lower strata of soil or from the aboundless atmospheric stores. Even in the poorest soils it grows a crop which will yield at least 4 tons of hay per acre. The nutritious value of the crop, as determined by chemical analysis, is about twice that of clover hay. The Prussian Minister of Agriculture has been so deeply impressed with the great value of this plant that a Government order has just been issued granting to every Prussian landholder who cultivates the plant on his waste land a subsidy of 30s. per hectare, a hectare being equal to two and a half English acres. As a consequence of this recognition of the plant all the avilable seed of the cultivated plant has been brought up at famine prices."

Having read this glowing account of this lathyrus, I made it my duty to obtain some seed from Germany. It reached my hands in January, and, in order to test its vitality, a few seeds were sown in in a flowerpot. They came up well, and the plants have, up to the present time, grown luxuriantly. The plants have been well taken care of, so that their healthy growth can hardly, as yet, be taken as proof that they will thrive equally well in open ground. We must, therefore, wait the result of the experiments which have been made in this way. With the seed I received an official report, made by the director of the well-known agricultural college in Germany, at Poppelsdorf, near Bonn, upon the plant, which says—"The wood lathyrus, or flat pea, is found growing wild in the forests here and there, especially on basaltic formations. The stalks trail along the ground often to the length of 15ft. The creeping roots also spread to an unusual length, and in consequence absorb from the poorest soil the most minute particles of nutritive matter contained in it for a great distance around the plant. It does not need any manure, and it resists drought. The wood lathyrus obtains a great age, and a specimen of a congener, the *Lathyrus latifolius*, has grown for no less than seventy-five years on the one spot.

The wood lathyrus has been experimented on and improved for several years by two gentlemen—Messrs. Wagner and Kühnemann—with the most satisfactory results. Even in the poorest soils the plants have considerably improved. For the first two years they grow slowly. During this period their rapidly spreading roots absorb the nourishing matter necessary for the development of the plants. After the time mentioned the growth is most remarkable, the crops yielding from 4 to 5 tons of hay per acre. The plant is also remarkable for its richness in proteine contained in the straw, which has been found to range from 21 to 24 per cent. Plants cultivated in sandy soil, and in heavy clay, possessed from 24 to 26 per cent., and in some samples of the straw of the lathyrus as much as 29 per cent. has been found."

The straw is richer in nutritious properties than any other; with, perhaps, the exception of lentil straw. A chemical analysis of some of the straw gave the following results:—

Proteine	13·97
Fatty matter	3·43
Woody fibre	37·98
Non-nitrogenous substances	39·00
Mineral matter...	5·62
	100·00

* The exceptionally high rainfall was only 30·872 inches not equal to that of our driest station in Ceylon. —ED. *T. A.*

The other day, on planting out the seedlings of the wood lathyrus in the open ground, I was agreeably surprised to note the wonderful development of the roots. Some of them were 18in. long, and some as much as 2ft., with a thickness equal to that of an ordinary writing quill. This fact confirms the statement of the director of the Agricultural College, that the roots develop and spread to an unusual length and depth.

The seed, as I mentioned, was sown at the end of January, and the plants were planted out in the commencement of June. The roots during that time had attained an extraordinary length and thickness. I do not think that there are many plants the roots of which in so short a period attain such a remarkable development. I believe that I have at length succeeded in introducing a useful forage plant, which, having regard to its unusual root system, is likely to suit our dry climate in an eminent degree.

I cannot avoid again calling attention to the well-known Cocksfoot or Orchard Grass (*Dactylis glomerata*, Linn.), and once more recommend it for more extensive cultivation than it receives. It is one of the most valuable of the grasses for permanent pasture that have been introduced into the colony. It is of vigorous growth, does well in almost any soil, and is much relished by cattle and sheep. It stands both feeding down and cutting down, and grows again with great rapidity. It is one of the most prolific grasses and possesses considerable nutritious properties, and is valuable for fattening purposes.

Museum of Economic Botany.—This popular institution loses none of its attractiveness, indeed, it is always made a favorite place of resort by the visitors to the garden. The large and valuable collection of exhibits contained in the building has been still further extended during the past year.

The continuous increases of objects in the museum makes it evident that we shall soon be much pressed for space in which the donations which are constantly coming in can be advantageously displayed. It is most gratifying to find that the collection forms one of the most attractive features of the garden. Visitors appear to be much impressed with the interesting features of the objects themselves, as well as with their simple and practical arrangement.

The Library has kept pace with the general extension of the objects for which our institution was established. A large addition has been made to the number of standard works, both botanical and horticultural, which are now available for reference. The latest issues of the reports of the Smithsonian Institue, and the reports of the Geological and Natural History Survey of Canada, possess the highest scientific value. The pamphlets issued by the different botanic gardens in botany, especially those issued from the Imperial Botanic Gardens at St. Petersburg, merit particular notice and attention.

THE COCO-DE-MER IN CULTIVATION.

With only one exception, the palms of the Seychelles have long since proved amenable to cultivation in our tropical plant houses. The genera *Stevensonia*, *Verschaffeltia*, *Roscheria*, *Latania*, *Dictyosperma*, *Acanthophœnix*, *Hyophorbe*, and *Chrysalidocarpus*, which are peculiar to this small group of islands, and which rank amongst the noblest of a noble family, are all well known in European collections of palms, their cultivation presenting no more difficulty than that of tropical plants generally. The coco-de-mer or double coco nut (*Lodoicea seychellarum*) has, however, so far proved unmanageable under artificial treatment, notwithstanding that many attempts have been made to establish it at Kew and elsewhere. So long ago as the year 1827, Sir William Hooker publish a series of figures and a description of the coco-de-mer in the *Botanical Magazine*, and recorded the arrival of living nuts of it at Kew, where, he says, "we cannot doubt of soon seeing them flourishing in our stoves." But they failed to grow, and although dozens of nuts have since been tried at Kew, not one ever got beyond the first stage of germination.

The absence from our collections of living examples of this most remarable palm is most disappointing to all students of the order. At Kew we have lately been successful in establishing living plants of the Ita (*Mauritia flexuosa*) and Bussu (*Manicaria saccifera*) palms of the Demerara swamps, and the Doum (*Hyphœne thebaica*) and Palmyra (*Borassus flabelliformis*) palms of Africa. These successes stimulated the desire once more to obtain a living plant of the coco-de-mer.

Application was therefore made in January last year, through the Secretary of State for the Colonies, for a supply of fresh nuts from the Seychelles, and at the same time directions for packing and forwarding the nuts were sent to Mr. C. Button, the Conservator of Forests at those islands. The Administrator, Mr. T. Risely Griffith, took a warm interest in the matter, and through his kind exertions several consignments of nuts were received, of which four germinated. Two of these are probably too weak to live, but the other two are in a most promising condition. The strongest has a radicle 3 feet 8 inches long, and 12 inches in circumference at the end where the plumule is developed. This is now a foot long, and is pushing a perfect leaf.

In a note by the late General Gordon on the germination of the double coco-nut, it is stated that the nut is planted horizontally, without the husk, when it sends out a sprout some 12 feet long, which pushes up the young plant at a distance of 12 feet from the nut. The longest "sprout" we have had at Kew has not exceeded 4 feet. Nor can it be made to grow horizontally, the point turning down perpendicularly however often its position may be altered. At Kew the nuts were planted in a bed of coconut fibre, and kept at a temperature of 80°-85° F. They were planted in June 1889.

Mr. Button had kindly undertaken to plant a nut in a Wardian case, and treat it according to our instructions until it had germinated and developed the plumule before despatching it to Kew. A nut thus treated arrived in July last in the most promising condition. The radicle is 1 foot 10 inches long, and the plumule is 7 inches in circumference at the base. It has a stout sheath-leaf, and a normal leaf 3 feet 2 inches long, 3 feet wide, with thirty-six folds. The midrib is curved, and the blade at present folded double. The texture is exceptionally firm, and the colour a deep green.

Full-sized trees of the coco-de-mer attain as much as 150 feet in height, with a smooth trunk about a foot in diameter. The leaves form an immense crown on the top, and each leaf is 20 feet long and 10 or 12 feet wide. The male and female flowers are on separate plants: the male inflolescence is shapped like a huge willow catkin, its length being 5 to 6 feet by 4 inches in diameter; the female is from 2 to 4 feet long, and it bears from six to ten fruits, each of which weighs from 25 to 30 pounds. They take seven years to mature and sometimes hang two years on the tree after they are ripe. The process of germination extends over about two years. According to General Gordon, the trees begin to fruit when about forty years old, and attain maturity in 120 years.

Royal Gardens, Kew. WILLIAM WATSON.

[The coco-de-mer is at present confined to Praslin and Curieuse, two of the islands of the northern group of the Seychelles Archipelago. It undoubtedly runs some risk of extinction from the long period which the nuts take to germinate, and from the fact that, the trees being of different sexes, isolated females may easily escape fertilization. Its cultivation in the Botanic Gardens of the tropics is therefore of considerable importance.

Plants have long flourished in the Royal Botanic Gardens at Peradeniya, and the following extract from a letter from the Director, Dr. Trimen, F. R. S., to Kew, records the interesting circumstance of a male plant having flowered:—

"Peradeniya, August 12, 1890.

"You will be interested to hear that one of our Lodoicea palms put out a ♂ inflorescence last month. The tree is thirty-nine years old. To my great dis-

gust, when the spike was about 6 inches long, some visitor cut it off with a blunt knife, and I found it on the ground. The flowers were all formed, and the structure exactly as described by Sir W. Hooker in the *Botanical Magazine*. I hope my other tree will prove ♀, but that is much younger."

Sir John Kirk also succeeded in establishing the palm in his garden at Zanzibar.

The Government of the Seychelles has long watched with care the preservation of the existing groves of the palm, and pains are now taken to fertilize the female plants artificially, and to plant the seeds.—W. T. T. D.] —*Nature*.

MR. E. ELLIOTT ON THE COST OF PADDY GROWING.

Mr. Elliot writes in answer to enquiries from the local "Times":—

"You and others, I find, misunderstand the scope and intention of my experimental cultivation and the publication of the results. The primary object is of course to show those amongst whom we are working that, by using the ploughs and incurring some little additional outlay quite within their means, much better crops can be secured. At the same time I have endeavoured to discover the *cost of growing paddy*, working on a ready money basis. I have necessarily had to work rather expensively with native assistants, on whose outlay I have a very imperfect check and who do not stint the cultivation. In spite of this my Galle experiment worked to R16 per acre (exclusive of taxes), and at Nintavur it worked out to R17·50. The information thus acquired is, I think, valuable, for it refutes the absurd *estimates* of the cost of cultivation advanced by many, such for instance as that given by Mr. Panabokke for Saffragam to the Grain Tax Committee.

"I have also given the return I got at Ninvtaur and shown that I went into a village, hired at current rates a parcel of land, cultivated it, and made a profit of R694 on an *outlay* of R612 in under six months (rent and taxes were paid after crop as customary and so entailed no outlay.) This was done in an unfavorable year, but in an irrigated district. This is the broad fact I wish to make known. Everybody can utilize my figures and see how they would be affected by the surroundings under which he can, or does, undertake paddy cultivation—for instance the district in which he hires the land; if he can or will or is obliged to do without irrigation; if he has his own money and cattle to work with, or must burrow and if so at what rate.

"These differ in each case and in every district, and everybody must work them out for himself, I consequently made no allowance for cost of land, interest &c; and as for contingencies the crop was a moderate one. For machinery I had only 5 iron ploughs and 4 native ploughs costing altogether about R40, on which I have charged R10·75 for depreciation and repairs; they are available for future operations.

"I added particulars of my other experiments to be perfectly above board and also to shew that, even in an unprecedented year of failure, there had been secured a profit (exclusive of rent, but after providing for taxes) of R819 on an outlay of R1,441 from 84 acres of land.

"A man can and does in this district cultivate 7 to 10 acres at one time, so that if the cultivators had been also the owners of the lands each would have had R70 to R100 to go with; but if the cultivators were not the landowners they would have probably had to pay about this for rent and had nothing beyond their wages for the time they were employed.

"I have my own views regarding paddy cultivation as carried on by natives, but cannot enter fully into them here except to say that, the more I look into it, the more am I convinced 'it pays' and if carried out on a proper basis it is probably the best paying produce ever grown in Ceylon. Just as with tea, coffee &c., there are places and circumstances under which paddy growing will *not* pay, and where it ought not to be tried; but this does not affect the real question. Still another branch of the question is whom does it pay as carried on by natives. This is a very difficult matter to say between non-resident landlords, money-lenders, and untrustworthy tenants; but because one cannot answer that question do not jump to the conclusion that 'paddy does not pay'. Again, in discussing the resources of these engaged in this branch of agriculture remember even in Ceylon "man does not live by paddy alone"—or by *one* cultivation per year. It is only *one* of his occupations in Ceylon.

Pray do not mix up my experiments with these considerations. My figures I think place beyond doubt that paddy can be made to pay handsomely. Others who have gone into the question and worked on a proper basis will tell you the same. Mr. Julian Dias told me recently it pays him 25 per cent. on the selling price of his field, and that no paddy land in the Western Province is worth less than R150 per acre—here R50 is a very good average price. The Kegalle Mudaliyar's experience also supports my views. If therefore any class allege paddy does not pay there are collateral reasons which must be searched for and examined, and the whole industry should not be decried wholesale, as is done in some quarters, because the expectations of any class interested are at times not realized."

THE BAMBOO.

There are countries where it seems to supply almost every human requirement, and where the feathery masses of its foliage, drooping, like the weeping willow over road and river and village, bespeak an ideal of life beyond the reach of less primitive communities. Here man is unspoiled by artificial wants, untouched by the march of thought or of science, and nature unsolicited supplies with lavish hand his simple needs. It is an ideal which it seems almost sacrilege to disturb, and in presence of which the highest aim of the foreign intruder should be to preserve its primary conditions intact. No better example can be cited of the land of the Bamboo than one of those Indo-Chinese provinces, of which Burmah is the best known to Europeans.

Like the fir in northern climates, it is the bamboo which here gives an unmistakable stamp to the rural landscape, while it is literally the framework and foundation of nearly every work of man. It is no exaggeration to say that the same jungles which give cover to wild animal life of every form and tribe, exert a beneficent influence also on every step of life of their human inhabitants.

The Burmese child plays with bamboo toys in a house of which roof and walls and floors are for the most part made from the same generous plant. Through boyhood and manhood and old age this helpful comrade is ever by his side. On land or water, in peace or war, in the homes of rich and poor, in art and manufacture, in the market and the field, at feast and funeral, this is the substance of all that man most needs and values for ornament or use.

Town and villages are built from its stems and leaves; the fisherman's rod, and float, and raft; the hunter's snare; it bridges the torrent, bears water from the well, and irrigates the fields. It is food and medicine for cattle, and even for men; and there is music, too, not only in the rustle of its leaves, but in its woody heart, from which more than one musical instrument is made.—*Blackwood's Magazine.*

THE PLANTING INDUSTRY IN JAVA.—Sugar crops in the native principalities of Java have all been gathered in with unsatisfactory results, owing to the prevalence of canker among the cane. Sugar planters have taken to planting larger stretches of ground with cane to make good the smaller yields. The tobacco yield shows a falling off, and prices have so gone from bad to worse that leaf from the island has become almost unsaleable at Amsterdam. Coffee on the other hand, promises well for next year. —*Pinang Gazette*, Nov. 7th.

COLONIAL CAREERS FOR YOUNG MEN *VS.* FARMING IN ENGLAND, IN A NEW LIGHT:

WHY NOT "ROUGH IT" IN RECLAIMING DERELICT HOME FARMS IN THE OLD COUNTRY?

The writer in the *Spectator* of "A Commentary in an Easy-Chair" has the following deliverance in reference to young men looking out for a career in tropical plantations, Australian farms, American ranches, &c.:—

"There appear in our magazines and papers periodically accounts of the doings of the young men who go out to the Colonies, who work in ranches, and settle in the backwoods, generally reported by proud and happy fathers whose glory in their hard-working boys is too touching in its vicarious vanity to be lightly disturbed. And yet the life which is described to us with so many virtuous flourishes is the hardest life that can well be imagined,—a life without comfort, without solace, a hard struggle at first for the barest living, which slowly grows into rude plenty, and perhaps in the end to prosperity in the ordinary sense of the word, but at the sacrifice of almost all that is beautiful, and much that is good in life. Hard weather and hard work, the endless, ever-recurring routine of primitive life, the conflict with all the elements, and rudiments of existence,—still more the abandonment of everything that is above or beyond the common day: these are the conditions of that life, which in so many cases seems the only resort for the boys nurtured amid every sweetness and comfort, lodged and served and fed, and even educated, as well as Princes are and much in the same way. To arrive at independence and a primitive wealth at the end may be a satisfactory thing to think of; but the sacrifices that are made to secure this are overwhelming. I have often asked myself whether these youths might not do as well if they settled, say, on a derelict farm in England, where unhappily there are many, and worked it as they do their Colonial patch of land, or bit of primeval forest. Supposing they had the courage to make themselves cowboys at home? not only to scorn delights and live laborious days, but to scorn appearances as they would do on the other side of the Atlantic, and use their faculties here as they do there? Could this be done with the possibility of a home behind them, in which to take refuge for a Christmas, for a holiday now and then, which would keep them within touch of the life to which they were born, might not their native fields be as practicable as Manitoba, and the primitive living be secured, and the primitive advantages, without so tremendous a sacrifice? I do not pretend to have sufficient knowledge to answer this question; but it is one that seems worth asking at least. I remember the time when spade-husbandry and the reclaiming of waste lands were considered to be a new gospel with an answer to all social problems in it. Times change, and all the panaceas change. Miss Martineau, in her series of tales on Political Economy—tales which it would be so strange to read nowadays, though they had the greatest effect in their time—has one (at least) to prove the sinfulness and waste of village greens and commons, which were so much land lost to the commonwealth. Nowadays we cling to our commons, and think land never so well bestowed as when it is made into recreation-grounds and parks for the people. But even now, though I am told that corn does not pay the growing, there is something in the sight (or even hearing) of fields lying untilled and desert which gives an ache to the heart. Could not the primitive life of labour be accomplished on them as well as in Manitoba? No doubt there would be difficulties. There are difficulties in everything: but are they invincible? I am unable to answer the question, but it seems one that is worth the asking, practically, as well as in words.

I have heard at least of one kind of farm upon which an experiment has been tried with remarkable success, and which no doubt has preserved at least one (there may be many) young Englishmen from Manitoba or California. This is a pheasant farm established on a bit of moorland by a quick-witted and practical-minded member of the class aforesaid, in which between birds, made ready to stock the coverts and furnish forth the battues of the sportsman, as well as the homelier necessities of the poulterer—necessities not unthought of, it is said, in the most aristocratic circles—and eggs, that make the birds, a few paternal acres (not at all adapted for corn-growing) have been made to produce a very comfortable income, with greater and greater possibilities for the future. This is one of the accidental possibilities which men occasionally strike out, when they have the instinct and spirit of success in them. And I think it very possible that Mr. Gladstone's suggestions about poultry and jam, though they have not been operative in changing the views of the farmer class, might equally answer in the hands of the youths predestined to be cow boys, if nothing better should turn up. There are, no doubt, many who would rather rear chickens at home and help to take away the reproach of England in the matter of fresh eggs, than herd the cattle in a ranch, or keep sheep on the Australian wilds, or pig in a log hut in Canada or California, through the most beautiful period of their lives. The jam might be trying if it required personal superintendence. One asks oneself whether one is justified in suggesting any such expedient in the face of the fact that there will not be standing-room in the British Islands within a few hundred years, according to the best calculations? This, however, scarcely matters so much when we reflect that, according to the same authority, a few hundred years more will see the same condition of affairs throughout the world, and there will be standing-ground nowhere,—in which case it does not matter very much, evidently, what we say. There will be peace in our day; and the world, so often threatened with all manner of catastrophes, has the chapter of accidents in its favour, and may go lumbering on for more centuries than any statistician would imagine. But in the meantime—why could not a ranch be tried in Essex, for instance, where I hear there is much unemployed land? If the boys are to be cowboys and farm-labourers upon whom we have spent so much care and love, why should they not buckle to, gird up their loins, and try it at home? It may be impossible; but, again, it might not be impossible. Of course the experiment would have to be conducted in the same way in which it would be conducted in Manitoba,—no gentleman-farmering, but hard work according to the Colonial or backwoods type, in which places gentleman-farmering certainly would not pay.

OUTLYING PORTIONS OF THE STRAITS SETTLEMENTS: PLANTING RESERVES.

We have received copy of a Sessional Paper embodying "Notes of Visits made by Sir J. Frederick Dickson, K. C. M. G., to the Settlements of Penang and Malacca and to the Native States of the Malay Peninsula during the period April-September 1890, while Administering the Government to the Straits Settlement," from which a few quotations will be of interest to Ceylon readers:—

April 13th, 1890.—Left Singapore in the "Sea Belle" at 1 p.m. with Lady Dickson, Captain Massy, R.A., A.D.C., and Mr. C. O. Blagden, Private Secretary, bound for Klang in Selangor.

April 15th.—The first thing in the morning visited the Botanical Gardens in company with Mr. A. R. Venning, who has laid them out with much taste and success.

May 14th.—Left Penang Hill at 6 a.m. On reaching the road at the bottom found the Resident Councillor (Mr. A. M. Skinner) and other gentlemen waiting to accompany me round the Waterfall Gardens. They are making great progress; the collection of foliage plants is becoming one of large and varied interest, and the grounds are being admirably developed by Mr. Curtis, the Assistant Superintendent of Forests in charge of the Gardens.

June 21st.—Left Singapore in the "Sea Belle" for Tanjong Kling.

June 29th.—Accompanied by the Resident, Mr. Berrington and Mr. Pieroe, Acting Superintendent of Works, I rode up to Terachi in the morning. The road passes through a beautiful and highly cultivated country, village after village in well-cared-for compounds or orchards lying in the valleys up which the track runs. Ayer Sejuk in Terachi I was met by the Penghulu of Terachi and the neighbouring Chiefs, who had created a *basie*, adorned with flowers and palms, in which breakfast was served.

The difficulties of traversing the Bukit Putus range by railway trace have been overcome, and I was able here to see how easy the trace will be down the Terachi and Muar valleys to Kuala Pilah, and how much the country, thickly populated as it is by a permanent Malay agricultural population, will benefit from the construction of a railway, which will reach Kuala Pilah in less than 22½ miles from Seremban, with a tunnel of 330 yards at Bukit Putus, where the line reaches its highest elevation of 713 feet above sea level (h. w. spring tides).

July 2nd.—Left Tanjong Kling in the "Sea Belle" and, after visiting the light-house on Pulau Undan, steamed on to the mouth of the Muar, where a launch was in readiness to take us up the river. At Bandar Maharanee I was received by the Acting Resident, Tunku Otbman, and by Messrs Garland and Faithful, who have been engaged on extensive waterworks for the supply of the town, and also on a narrow gauge line running at present 8¼ miles along the coast to Parit Jawa.

The line is on a 2-foot 6-inch gauge, and though not yet ballasted, is open for regular traffic, and is earning, in addition to its working expenses, something under 5 per cent on an expenditure of $75,000. It is proposed to extend it about 17 miles to Batu Pahat. The areca-nut groves through which it passes extend along the sea shore about 30 miles and have an average breadth of 5 miles. After a drive round the town I went up the line as far as Parit Makar, about 4½ miles from Bandar Maharanee, and then returned to Malacca for the night.

July 19th.—Arrived off Kuala Pahang about 11 a.m. Found the "Porpoise" there, and was met by the British Resident, Mr. Rodger, in the launch "Ethel," which took us over the bar and up the river some 7 or 8 miles to the Pekan, where the river banks and the landing stage had been prettily decorated by the inhabitants, a beautiful arch erected by the Sinhalese residents forming the centre of the decorations. Later in the day walked round the town. The Gaol in particular is noticeable for the clever manner in which the simplest and cheapest materials have been used to make a secure prison. The palisade is made of pointed palm trunks which are fixed side by side in the ground and held together by transverse bars of timber, not nailed on to the uprights, but running through holes pierced in the palms and threading them together into a fence very difficult to scale.

July 22nd.—Found the "Porpoise" anchored off Tringganu about 2 miles from the shore, and took up a berth just inside her after passing a very numerous fleet of fishing boats putting out from the mouth of the river. We climbed up to the old fort which commands the Kuala. This looks more like an observatory than a fort, guns of obsolete patterns are mounted at all sorts of angles on slender wooden pillars and pointed to the sky like telescopes, but it commands a fine view. The town is of considerable size, and the large fishing fleet seen in the distance bears witness to considerable enterprise on the part of the inhabitants. The country inland and along the coast is densely covered with coconut palms, but it was evident that the beetle which has done so much harm in the Colony is in possession also at Tringganu, and a great many trees along the coast have been destroyed by it.

July 26th.—Reached Singora at 7 a.m. A Siamese dagoba on a conical hill makes a prominent landmark near the mouth of the river; groves of coconut palms and casuarinas (Malay *rhu*) were seen here along the shore, as at most of the places we visited in these parts, and as usual, too, the coconut palms near the shore had suffered considerably from the beetle. The natives say, however, that its ravages are limited to a narrow strip of land next the sea. The Governor, whose great-grandfather was a Chinaman, is a very intelligent man, and shewed me several photographs of his own taking, and a good lathe with several very creditable productions of his own from it.

Retired from the busy part of the town is a well kept enclosure containing several Siamese Buddhist temples, some of them most elaborately decorated and extremely curious, and, in some of the details, beautiful.

Sept. 2nd.—Arrived at Penang at 8 a.m.

Sept. 3rd.—An interesting case of *latah*, or imitative madness, in some respects like "echo" insanity, was brought on board for Dr. Ellis to see. Saw the Superintendent of Police, Mr. Bell, in reference to the action taken in Executive Council yesterday, and after despatching letters to Singapore, weighed anchor at 11 a.m., leaving Mr. H. Trotter in charge during the absence of Mr. A. M. Skinner, whom I added to our party as Consul for the Siamese ports of the West Coast of the Malay Peninsula, with Mr. F. T. Thorold of the Perak Service as my Interpreter.

We left Captain Cameron in Penang to meet Mr. Kelly, late of the Indian Survey Department, who is going to carry out the Penang Survey on the system recommended by Colonel Barron, B.S.C. (*see* Sessional Papers, 1887, Appendix No. 11), and Mr. Bostock, who comes out from England to obtain particulars to enable Sir John Coode to report on the best system of wharves for improving the Port of Penang.

Sept. 8th.—Had an interview with Mr. John H. Bostock, who has come out from England to report on the best means of giving Penang Harbour such wharf and warehouse accommodation as the trade requires. Also with Mr. F. W. Kelly, late of the Indian Survey Department, who has taken service here to carry out the cadastral survey recommended by Colonel Barron, B.S.C.

September 10th.—Up at 5 a.m., and at an early hour we bade adieu to our kindly host, and sailed some two hours later than we had intended at 7 a.m. for Goh Mak, a low alluvial island formed at the mouth of the Punga River. Up the river we passed close under these perpendicular cliffs, which rise abrupt from the water's edge to a height of some 1,200 feet, clothed from foot to summit with small trees of great variety. Had a day amidst natural scenery which it would be difficult to find equalled anywhere in a ten hours' sail. Punga is a small State with some tin mines, and a population of Siamese, Chinese and (a few) Malays. The Raja is a veritable "Lord of the Isles," but the right to collect the edible birds' nests which are found here is in the hands of the Malay Raja of Kedah, not, as has been supposed, a survival of the Malay supremacy by sea of former days, but as a farmer of this part of the Revenues of Siam!

It was fortunately one of the days for the market held here twice a week, and the whole length of the main street was lined with stalls kept by Chinese men and by Siamese women, in which vegetables and fruits, fish dried and fresh, and various kinds of country produce in abundance were displayed for sale. Close to Tap Tian we had passed through extensive fields of splendid pepper vines—the finest grown in the Peninsula—owned chiefly by British subjects—Penang-born Chinese. The pepper here is grown climbing on living dadap, on the Sumatra system, instead of on dead sticks like hop-poles. The soil is deep red laterite thoroughly disintegrated. Trang is closely connected with Ligor on the East coast, there being between the two places one of the routes across the Peninsula; and it was by this route that Antonio de Miranda de Azevedo, the second Envoy sent by d'Albuquerque to Ayuthia—the then capital of Siam—made his journey, going from Malacca by sea to "Taranque" and thence by land with horses and draught oxen. The roads in the early part of the 16th century must have been better than now, as they are not good even for elephants and would be absolutely impassable for draught oxen. The population is Siamese, Chinese

and Malays, and here, besides the languages of these three races, there is spoken the patois known as Samsam, peculiar to the Siamese who have become Muhammadan.* The term "Samsam" is said on the spot to be a corruption of "Siam-Islam."

September 18th.—Went up the river to visit the graves of Mr. Birch and the soldiers who are buried with him at Bandar Bharu, and the monument erected to the former at Pasir Salak. Mr. Wray had kindly made excellent arrangements for the journey, and we left the "Sea Belle" at 6 a. m. and drove across the narrow neck of land behind Teluk Anson to Durian Sabatang, saving thereby five miles of river, and met there two of the Perak launches which had been sent round earlier with the servants and provisions. After an hour upstream in the steam-launches, we transhipped into three house-boats at Bandar, where the river shoals considerably, and, poling upstream, arrived at 8·30 at Bandar Bharu, seventeen miles above Teluk Anson. Here we were met by the Penghulu and headmen, and walked up to the enclosure containing the graves, which is about three hundred yards from the river, and is approached a well kept path bordered with flowering shrubs. The enclosure itself looks very nice and well-cared for. It is surrounded by an iron railing, and in the middle of a grass plot is an ornamental railing enclosing five graves with crosses of polished granite. They cover the remains of Corporal Fay, of the 10th Regiment, killed at Knala Biah on the 7th November, 1875; of Captain William Innes, R. E., killed at the same time and place; of James Wheeler Woodford Birch, British Resident, Perak, assassinated at Pasir Salak, 2nd November, 1875, aged 49; of Gunner R. Hardy, R. A., died in Perak, 17th December, 1875, aged 32; and of Private W. Smith, 3rd Regiment "The Buffs," died in Perak, February, 1876. There are also three unknown graves in the enclosure. On rejoining the boats, we went 7 miles higher up the river to Pasir Salak, arriving there at noon, and finding that preparations had been made for our visit. Raja Musa, the younger brother of the Sultan Abdullah under whose suspices the murder was committed, and who was himself exculpated when the murderers were brought to justice, met us with a large number of the natives at the landing place just opposite the monument. This stands about 30 yards from the river bank in a small enclosure and is an obelisk of unpolished granite bearing an inscription in Malay and English on a slab of white marble. The English words are:—

"This, the site of the Fort of the Marajah Lelah, and near the spot where the British Resident, J. W. W. Birch, was treacherously murdered on the 2nd of Nov. 1875, is ordered by the Government of Perak to be for ever kept desolate and uncultivated."

*The mixed Malayo-Samese people, commonly known as Samsams, form the bulk of the population in the lower parts of Ligor and Sengora and in the north of Kedah. Although entirely assimilated to the Siamese in speech, customs and religiou these Samsams appear to be allied physically much more to the Malay than to the Tai stock. Yet their national sympathies seem to be altogether with the dominant race, and the people, especially of Ligor, have during the present century zealously co-operated with the Siamese in their persistent efforts to subdue the Malays of the neighbouring States.—*Encyclopædia Brittannica*—Article "Malay Peninsula."

RUSSIA AS AN OUTLET FOR INDIAN TEA.

To the Editor of the *Home and Colonial Mail.*

Sir,—I think a brief account of a visit which I recently made to the country of the Czars may not be without interest to many of your readers. The principal object of my journey was to endeavour to ascertain *on the spot* what were the prospects of introducing Indian taes into that country, and to this end I was greatly assisted by the kindness of friends, through whom I was furnished with several good mercantile and other introductions.

At Petersburg, whither I first directed my steps, I had an opportunity of discussing *tea* with several persons connected with the *trade* as well as with other commercial people, whose acquaintance I made on the *Bourse.* I was strongly advised, however, to proceed to Moscow, which is the chief centre of the wholesale trade. I accordingly went on to that city, and was sufficiently encouraged by what I saw and heard to remain there for eight days.

Here I had the advantage of the assistance, as well as the benefit of the experience, of Mr. Rogivne, the representative of the Ceylon planters, who had been at work, first for five or six weeks in Petersburg, and latterly in Moscow, introducing his Ceylon teas to the notice of the wholesale trade as well as to the large retail houses, such as Popoff, Kousnisoff, &c., &c. We visited (either separately or together) the principal tea merchants, and tasted with them samples of both Indian and Ceylon teas. By most of these firms I was very kindly received, more particularly by the firm of Wogau, by Bergmann Bros (who represent Fred. Huth & Co.'s house), and by the representatives of the Koenigsberg Commercial Association; also, both in Petersburg and in Moscow, by gentlemen who were formerly the tea specialists in the powerful house of Knoop, when that firm made tea one of its specialties.

As was, of course, to be expected, most of the "*trade*" expressed the opinion (just as was done in England formerly) that it would take a long time to *change the Russian taste.* All, however, complained of the great deterioration which was taking place in the quality of China teas, while the Russian taste demanded, *no* worse, but *better* teas. Most of the firms appear to be kept well supplied with samples, both of Indian and Ceylon teas, by their London agents; but great expense and delay attends the introduction of Musters, while, owing chiefly to the delay, business in them is usually very difficult to carry through. The teas apparently which seem, most nearly, to approach the requirements of the are *medium* or *good Pekoes-Leaf teas without dust or broken*, either Ceylons or Darjeeling and Dooars teas; but there were also Assam and Cachar teas among the samples which appeared suitable.

Coarse Indians (*i.e.*, Souchong grades and lower); *pungent* teas, and teas with a *high fired* flavour, appear to meet with *least* favour; *tippy* teas, too are to be avoided. *Dark liquoring* teas are needed, because, although Russians drink their tea light in colour, this is effected by filling up a small quantity of strong extract with a large quantity of hot water from the Samovar. Everything appears at present to be favourable to the introduction of Indian and Ceylon teas. The duty of course, is high, about 1s 9d per pound; but the Government, while augmenting the duties on all other imports, has left *tea* alone. The exchange is favourable to importation and the gold premium (duty being paid in gold) is also comparatively favourable to importation. The Russians, both high class and low class. are, more or less *connoisseurs* of tea and their method of drinking it (without the addition of milk) is most in favour of teas possessing some pretentions to *quality.* The overland trade appears to be much on the wane, so that the prejudices of Russians against ocean-borne teas is being rapidly dissipated. The Government is, moreover, giving great encouragement to the importation of tea by way of Odessa, with the view of providing a return freight for the subventioned line of steamers (the Volunteer Cruiser Fleet) trading between that port and Vladivostock—the eastern outlet of Siberia and the Russian Central Asian possessions. These vessels, moreover, pass Colombo, and moderate inducement would no doubt lead to their touching also at Calcutta, or other Indian ports.

I leave the subject here, as this letter is already too long, but with your permission I may venture again next week to return to it, and make some further suggestions.—I am, &c.,

Geo. Seton,

14, St. Mary Axe, E. C.,

London, Oct. 22nd, 1890.

THE CUSTOMS' REPORT ON THE TEA TRADE.

The annual report of the Commissioners of H M. Customs for the financial year, ending March 31st last will be interesting reading to those who are interested in the growth and development of the tea trade of India and Ceylon. From this report it appears that the gross amount of duty received upon tea was £4,490,695, a decrease of £139,621 upon that received in 1888-89. The report says:—

It had been so generally anticipated in the first quarter of the present calendar year, which corresponds with the last quarter of the financial year 1889 90, that a reduction would be made in the tea duty, that merchants and dealers became very cautious in effecting their clearances for Home consumption. The effect of this caution has been very apparent on the yield of this head of duty, and the decrease shown is more than accounted for by the difference in the amount of tea cleared in the quarter ended March 31st, 1890, as compared with the same quarter of the preceding year. This difference amounts to 6,000,000 lbs., equal to £150,000 in yield of duty. It thus appears that had it not been for the surplus of revenue which it was evident before the close of the financial year 1889-90 would be at the disposal of the Chancellor of the Exchequer, and upon which the anticipation referred to was founded, the receipt from the tea duty in 1889-90 would probably have only exceeded the actual receipt of 1888-89 by rather more than £10,000. This result cannot be said to be satisfactory from a revenue point of view, especially having regard to the importance of the tea duty as one of the principal sources of receipt, on account of the Revenue, under our charge. It is no doubt, however, to be traced to the displacement of Chinese by Indian and Ceylon teas, to which we have in recent years called the attention of your lordships in our annual reports, which has continued in an increased degree in the year 1889. It is not possible to trace with *absolute* accuracy the rate at which consumption of the various kinds of tea has proceeded in this country, because the official accounts have not hitherto been kept with a view of affording information on this point, but the following table shows the proportion contributed by China, India, Ceylon, and other countries, respectively towards each 100 lb. of tea imported into this country during the last twenty-five years. It must be borne in mind in examining this table as bearing upon actual consumption, that Chinese tea imported into this country is to a large extent exported again, whilst the bulk of the Indian tea imported is consumed in the United Kingdom.

OF EACH 100 LB. IMPORTED.

	China contributed. Per cent.	India contributed. Per cent.	Ceylon contributed. Per cent.	Other countries contribute Per cent.
1864...	92·55	2·84	...	4 61
1865...	93	2·50	...	4·50
1866...	93·74	3·88	...	2·38
1867...	91·81	6 07	...	2·12
1868...	91·77	5·89	...	2·34
1869...	90·86	8·07	...	1 08
1870 ..	89·06	9·17	...	1·77
1871...	88·25	8·91	...	1·84
1872...	86·80	8·89	...	4·31
1873...	83·81	11·28	...	4 91
1874...	81·98	10·12	0·30	6·90
1875...	86 31	12 87	0·08	0·74
1876...	84·03	14 99	o·05	0 93
1877...	82 65	16·50	...	0·85
1878...	80·88	17·29	...	1·83
1879...	76·94	20·76	0·07	2·23
1880...	76·43	21·81	0·08	1·68
1881...	77·33	21·66	0·08	0 93
1882...	72·83	25·43	0·24	1·45
1883...	70.27	26·66	0·90	2·17
1884...	67·22	29·55	1·03	2·20
1885...	65·84	30·35	2·00	1·81
1886...	62·99	31·85	3·10	2·06
1887...	54·00	38·15	5·89	1·96
1888...	47·43	40·34	10·10	2·10
1889...	39·88	42·93	14·70	2·49

The year 1864, with which the preceding table commences was the last year of the old rate of duty of 1s per lb., and in that year the total importation of tea was 124,359,243 lb. In 1865 the duty was reduced to 6 per lb., and in 1866 the total importation of tea rose to 139,610,044 lb. In this increased importation India fully maintained her position. The importation from that dependency rising from 3,534,509 lb. in 1864 to 5,413,583 lb. in 1866, has continued to progress with rapid strides until, in the year 1889, she contributed nearly 43 per cent of the total importation of tea into this country. But the growth of the culture of tea in Ceylon has progressed in a manner even still more remarkable. It is only within the last ten years that this culture has been carried on to an extent appreciable in the export trade of the colony, and it was not until as recently as 1884 that she contributed 1 per cent of the tea importation into the United Kingdom. In that year the contribution of Ceylon amounted to 2,210,983 lb. and it has since mounted up year by year by "leaps and bounds" as shown by the accompanying details:—

		lb.
1885	...	4,242,244
1886	...	7,144,313
1887	...	13.062,040
1888	...	22,509,564
1889	...	32,673,294

We may also point out that this advance both in Indian and Ceylon teas has been arrived at in face of the fact that the average price of these teas is considerably higher than the average price of Chinese teas. In 1889 the great bulk of the tea imported from China was Congou at an average price of 7½d per lb., whilst Indian tea averaged 10½d and Ceylon 11d per lb. Whilst, however, the displacement of Chinese by Indian and Ceylon teas has acted injuriously upon the Revenue, owing to the greater strength inherent in these grown in the latter countries, it would be incorrect to assume that tea beverage is decreasing in popular favour. The following figures show the consumption per head of tea leaf by the population for each of the last ten years:—

1880	... 4·57		1885	...	5·02
1881	... 4·58		1886	...	4·87
1882	... 4·67		1887	...	4·95
1883	... 4·80		1888	...	4 95
1884	... 4·87		1889	...	4·91

The figures for the calendar year year 1889, which were not disturbed by anticipation of the Budget to which reference has been already made, appear to indicate a fall in consumption of leaf, and to bear out our anticipations on the subject last year; but inasmuch as it requires a smaller amount of Indian or Ceylon tea-leaf than of China leaf to produce a given measure of tea beverage, and as the demand for Indian and Ceylon leaf is increasing, there is no reason to suppose that less tea beverage is, or it likely to be consumed.

BOGUS TEA.

The Commissioners of Customs have often had their attention called to the sale of tea at prices so low that it is manifest that the tea could not legitimately have passed through the hands of their officers; and in tracing out the history of such tea it has been ascertained, on fairly trustworthy evidence, that it has been obtained from the sweepings of warehouses, and sifted on the premises of the remover. This sifting is a somewhat laborious work, but, nevertheless, it is done by very cheap labour, and the sale of the tea, though at a very low price, yields a fair profit. So far as the Customs regulations go, no such tea in any quantity ought to leave the warehouse, because all spilt or damaged tea discernible is collected and thrown into what is called "the damage hole," for destruction. It is, however, necessary for the merchants and warehouse-keepers to clear the warehouses of wood, paper, nails, lead, and other refuse, and this is done by sale to carting contractors. In moving this refuse it is difficult, if not impossible, to prevent a quantity of tea from being taken up at the same time; and, in spite of all the care which the Customs officers may exercise, there is no doubt that a considerable quantity of tea in the course of the year does so leave the warehouse, and, of course, leaves without any duty being paid. In one or two cases where it was found that this tea was being largely trafficked in, the Board of Customs directed its seizure, and expressed a desire that the person sifting and selling it might be prosecuted; but, on the whole, it was thought

that, although the tea could not be said manifestly to have paid duty, yet that as it had not been removed furtively, and to a certain extent had even been taken with the consent of the Customs officers, it might be difficult to contend that it constituted "uncustomed goods," or that selling the tea could be sustained so as "a dealing with uncustomed goods," so as to involve a penalty. At the same time, it was manifestly injurious to the revenue that such a practice should be allowed to continue; and, also, there was no moral reason for it, because the removing contractor pays only for refuse and is not supposed to convert any of that refuse into an article by the sale of which in the market he would presumably displace an equivalent amount of the same article which would otherwise pay duty. It has consequently been enacted by the recent Act, that when any goods of a kind or description liable to a duty of Customs have been taken from a warehouse either with or without the permission of an officer of Customs, as unfit for consumption by reason of the mixture therewith of any other matter, the separation of such goods shall be deemed to be dealing with them with intent to defraud Her Majesty, and shall involve penalties accordingly.—*H. & C. Mail.*

PATENT LEGISLATION FOR A CENTURY.

The present century has been the time, and the United States the place, in which invention has made its greatest strides.

The growth of the patent system in the century which has elapsed since the first patent law was passed in 1790 has been enormous. Only three patents were granted the first year, and only fifty-five were granted under it before its repeal in 1793. The whole number of patents granted before 1800 was 256, a little more than one-half the number now issued weekly. The number issued in the last ten years from 1880 to 1890 was 195,454, or more than 800 times the number issued during the first ten years of the patent law. During the forty-six years prior to the passage of the act of 1836 the number of patents granted, exclusive of reissues, was 9,957, a number now exceeded in a period of six months. The number of patents issued by the office in 1836, after the date of the act establishing it, was 109, and the number for the fully year 1837 was 436. The whole number of patents issued in 1889 was 24,083. The whole number of patents granted since 1836 was 431,541. According to Mr. Smith's calculation, in fifty-four years the number of patents increased more than fifty-five fold, the receipts more than forty fold, the expenses more than thirty-two fold and the number of persons employed seventy fold. This increase has been truly wonderful. It speaks volumes for the growth of invention and the application of science to industry in the last century, and more particularly in the last half century.—*Bradstreet's*, Oct. 25th.

COTTON AND TEA.

We notice that some of our contemporaries have at length sounded the note of alarm respecting the inevitable effect that the recent rise in exchange will have upon many of the tea gardens. It must be manifest to the merest tyro that should the rupee rise to par or even remain at its present value those gardens that have kept afloat simply by selling in London to obtain the benefit of the exchange, must close, for it is not to be expected that either banks or agency houses will continue to advance funds to bolster up concerns whose prospects are hopeless. Such companies who possess flat or undulating land, not liable to wash, with good soil, favourable site with regard to communications and a superior *jat* of plants will no doubt, continue to hold their own, but a glance at the dividend list is sufficient to shew that most of the older gardens, especially those planted on steep sandy *teelahs* are doomed, and in fact several are now in liquidation, while others, unless they can raise money for opening fresh planting on favorable sites, must in due course follow suit; but as we have written above, the probability of such concerns being able to obtain pecuniary assistance is highly problematical. When the falling off in yield and quality is due to exhaustion of the soil and the *lay* of the plantation is moderately flat, we would reiterate the advice given some seventeen years back, viz. to dig well into the root finely pulverised lime stone, at the same time making either trenches of renovating pits between the rows of plants, which should be filled with bheel soil, if available, mixed with vegetable refuse and also a due proportion of lime stone. But best of all the coolies should be induced to stall their cattle for the night in one or more sheds, down the centre of which a drain should be carried so as to secure the urine in a tub, tank or other reservoir, and this, added to the other matters we have enumerated, well worked into a compost would go far towards stimulating the flagging vitality of the exhausted plants. Annually cutting back a certain area until the whole plantation has been thus treated, adopted in conjunction with high manuring, has proved beneficial, though, of course, diminished return would have to be submitted to until the cut back portion had re-grown sufficiently to bear plucking. All this, of course, means the raising of fresh capital and, probably, many shareholders would demur to what they, no doubt, would consider as throwing good money after bad, but unless they make up their minds to adopt some method of endeavouring to retrieve matters—and we venture on one or two suggestions—the alternative is bankruptcy, for that in the case of tea properties under the present out-look, is the true interpretation of the more euphonious term liquidation. Upon those plantations were the plant is exhausted but the soil still retains a moderate amount of vigor, we would recommend the cutting back of the entire planting and the sowing between the rows in well manured pits, which could be easily and rapidly excavated by means of small sludges such as are used in ascertaining the character of the soil in river beds, with the best cotton seed available; for if it pays to grow cotton in the southern states of the U. S. A. with wages equivalent to R24 per month, it would surely do so in Cachar, at less than half that rate. Of course, some arrangement would have to be come to with the steamer companies for conveying the bales to a sea port at a reasonable rate, or if the companies declined to entertain any proposition for reduction in freight it would be necessary to raise funds for the purchase and equipment of one or more steamers and flats, on the co-operative principle. It is no use people arguing that cotton will not pay, as every cold weather an enterprising foreign firm locates its employés with gins and presses at Goalpara in Assam, purchasing cotton from the Garrows with highly profitable results.

It must be recollected that the difference in price between cotton and tea is, under the present state of the tea market, not so very great and, when it is considered that cotton needs but packing in gunny (costing but some 6 annas per bale) and that tea requires lead-lined chests, solder clamps, etc., the difference in laying down the two commodities is reduced to a minimum. Reverting to the question of cultivation it must be borne in mind that tea gives no appreciable yield till its fourth year, while cotton, being an annual, furnishes returns in nine months; though among the hill tribes who know nothing of manuring the *jhooms*, cultivated by them, are abandoned after three years—the soil being by that time considered exhausted. Were the system of cultivation, adopted in the cotton states, followed out in Cachar, Sylhet and Assam, the same fields would turn out steady even crops for twenty years and even should signs of deterioration become apparent, most of the non-paying tea concerns have sufficiently large tracts of forest to fall back upon, so that no anxiety on the score of want of area need be entertained.—*Indian Agriculturist*, Oct. 25th.

A RUSSIAN BUYER OF CHINA TEAS AND THE PROSPECTS OF CEYLON TEA IN RUSSIA.

I have had some talk with a Russian buyer of Ceylon teas, who is also taking a trip home in the "Irauaddy." His knowledge of English is unfortunately some-what limited, and his French, like that of most Englishmen, is also rather "rusty," but I learnt that he had had three or four years' experience as a tea buyer in Hankow and Foochow, and he was herefore likely to be able to express an opinion about the China tea market, and the prospects of Ceylon tea in Russia. Perhaps his ideas are a little biassed, but it is well to hear both sides. While the exports of China tea to Great Britain have diminished so tremendously, and the quantity of tea sent down from the gardens had considerably decreased, he did not appear to think that there was an appreciable falling-off in the quantity sent to Russia, but if I understood him correctly he thought that in ten years English buyers would entirely give up buying China teas and would buy only from Ceylon and India. Many of the China growers, he said, are now rooting out their tea, and planting potatoes instead. But he does not think that the Russians will take kindly to Ceylon teas for several years, as our teas have not that peculiar aroma to which they are accustomed in the China teas, and of which they are so fond. We tried a few cups of Ceylon tea on board one afternoon, and he thought it was decidedly strong—too strong for the Russian taste. But that may have been the fault of tea we tried, or the fault of the brewing.

A. T. B.

RUBBER IN BRAZIL.

PARA.—Messrs. Singlehurst, Brocklehurst & Co. write under date of the 5th inst.:—RUBBER.—Since our last advices has been almost constantly in active and general demand, causing our market to assume a most animated and strong position, in harmony with the stimulating features, which, in consequence of greatly reduced stocks, prevail for the time being at the American and European consuming centres. Buyers meeting the market liberally, all arrivals were immediately taken up by them, and frequently bespoken before the rubber had made its appearance, with the result that prices have advanced to 3$300 per kilo. for fine and 2$300 for coarse Islands rubber, while last sales of Up-river have been made at 3$500—2$500 for fine and coarse respectively. As there are no stocks available and arrivals have been small during the past few days prices are well maintained. Just now, however, buyers seem to have satisfied their immediate wants, and may resume larger operations on less spirited lines. An interesting census has been recently taken in the Purús river district, one of the most important regions for the extraction of rubber, which reveals a shocking result. Basing the estimate on the number of immigrants, chiefly from the neighbouring states who have gone to that district during recent years, it appears to have been considered that its population consisted of rather more than 40,000 souls. It has, however, been reported, on what is said to be reliable authority, that the number existing—including children—is only 16,000 souls. The mortality always considerable, and the most lamentable feature in connection with the production of rubber, is described as having been stupendous last year, especially on the Acre river, where the banks are plentifully sprinkled with crosses, marking the ravages of fever and disease. If this has been the fate of native immigration, what may be expected for Europeans should they ever venture to these parts?—*Rio News.*

SCHOOL OF AGRICULTURE, COLOMBO:

PRIZE DAY.

Yesterday (Nov. 29th) afternoon took place another of those pleasant gatherings which recur annually at the School of Agriculture in the Cinnamon Gardens. The entrance to the building was tastefully decorated and the school-room had much artistic labour bestowed on its decorations. The Hon. the Colonial Secretary presided, and amongst others present were the Hon. J. J. Grinlinton, Hon. W. W. Mitchell, Hon. Dr. Anthonisz, Hon. M. C. Abdul Rahiman, Messrs. H. W. Green, J. B. Cull, T. E. De Sampayo, Mrs. and the Misses Keith, Mr. James De Saram, Dr. H. M. Fernando, the Maha Mudaliyar, Mr. O. Dreberg, Mr. and Mrs. Joseph, Messrs. C. Thomasz Walter Pereira, R. P. Jayawardena, Mrs. and the Misses Beven, Mr. and Mrs. Schrader, Mr. O. M. Fernando, Mr. and Mrs. Jeronis Peiris, Advocate Senathi Rajah, Miss Frédoux, Mr. Ranesinghe, Mr. J. S. Drieberg, Mrs. and the Misses Attygalle, Miss Lindsay, Miss Drieberg, Mrs. and the Misses Grenier, Mrs. C. Drieberg, Rev. S. Lindsay, Mrs. A. de Saram, Dr. and Mrs. Asreappa, Mr. and Mrs. F. Dornhorst, Rev. T. O. Hillard, Dr. Bowles Daly, &c.

The proceedings commenced by the President calling upon the Principal (Mr. C. DRIEBERG, B.A.) to read his Report.

Report was of a very encouraging nature, and its reading was punctuated with frequent marks of applause from the audience. It alluded in terms of praise to the late Governor Sir Arthur Gordon, who had by his encouragement and patronage in previous years shown his interest in the work, of the School. His Excellency Sir Arthur Havelock was prevented from presiding owing to pressure of work, but he had already shown his appreciation of the work carried on in the School by visiting it. The presence of Sir Edward Walker was an indication of the interest he evinced on behalf of the school. The report next proceeded to state the results of the operations carried on in the various provinces by the students who had been sent forth from the School. One of their men had been appointed as an agricultural instructor in the fever-stricken district of Walapane—the condition of which district the energetic Assistant Government Agent of Nuwara Eliya was endeavouring to ameliorate. That appointment made up a total of twelve students who had been employed as agricultural instructors—seven of whom were paid by Government and five privately. It was a matter for congratulation that the Government officials rendered valuable assistance to the cause of agriculture, notably the Government Agent of the Eastern Province, the Government Agent of the Sabaragamuwa Province, and the Assistant Government Agents of Matara and Kegalla. Another batch of students was leaving College on completion of their studies to engage in agricultural pursuits. It included some excellent young men, among whom was Mr. J. J. Koddipilly, who has had a brilliant career at the School. One feature of interest was the publication of a Monthly Magazine devoted to the interests of Agriculture; and this literary effort is appreciated by those for whom it was was intended. The School Museum is growing in size, the Agricultural Discussion Society is well supported by both students and outsiders. A dairy has also been set on foot by the headmaster, Mr. Jayawardena, and experiments have so far been attended with success, and it is satisfactory to note that a long felt want has been supplied. Through the knowledge imparted in this branch of agriculture the students could gain a knowledge of the proper housing, feeding, and general treatment of cattle in health and disease. Another feature of interest in the report was the fact that a large variety of crops had been grown on the School grounds with the view of demonstrating the most approved methods. The report next referred to the willing help and ready assistance of Mr. De Silva, the second assistant, not only by teaching in the School but by his writings. Another student of last year's batch has been employed as a conductor on an up-country estate; and it was satisfactory for the Principal

to note that the advantages of employing such men consisted not merely in having an intelligent manager but also a disciplined and honest employee. The report concluded by speaking of the loss of their old Director, Mr. Green, to whom the School owed its existence and success, but they had also to welcome the presence of Mr. Cull, whose established reputation as an educationalist insured the successful direction of the Department of Public Instruction.

Mr. J. B. CULL, M. A., the new Director of Public Instruction, then rose and said:—Sir Edward Walker, Mr. Principal and ladies and gentlemen,—I congratulate myself in the fact that my predecessor, Mr. Green, has come amongst us this evening prepared with a speech. The School is pre-eminently a poem of his own composition; and the fact that I am so completely new to the use of the plough makes it impossible for me to comment on the nature or the results of the School in any way as adequately as I would wish. I congratulate you, Mr. Principal, on the record you have been able to present for the year. I learn that that there are 26 students on the roll, and the report of those students who have been sent forth to work in the various districts is entirely satisfactory. (Applause.) I leave it to my predecessor to comment upon the various modes of agriculture that are carried on in the island with unvarying success in the various provinces. As regards the School itself I note with great pleasure that it embodies one of the most noble feelings, and, what is best, it teaches the dignity of labour. (Applause.) Passing the compound the other day I was struck by seeing the boys engaged in mammottying and other kinds of operations, and in a country like this, such kind of work is eminently satisfactory. It has been wisely remarked that a man who makes a blade of grass to grow in a place where there was no grass at all is a benefactor to the country, and this is the great object of the Agricultural School—multiplication of the fruits of the earth; making nature yield more abundantly and tending to eliminate as far as human agency can eliminate the ill-effects arising from untoward climatic conditions in the island. (Applause.) Reading in connection with this subject a poem written many centuries ago, entitled, "Georgis de Virgil," I was struck with the rule laid down regarding ploughing in which the author recommends that as a preparation for ploughing one should take his coat off, and put his shoulder to the plough, and it is universally true that a man who cannot take his coat off and put his backbone into his plough is a very incomplete agriculturist. (Applause.) I will not occupy your time any longer in view of the speeches which are to follow, save to express my great gratification at being present here this evening and to express the interest I have always taken on behalf of the School of Agriculture. (Loud applause,)

Mr. H. W. GREEN next rose, and said that the students of the Agricultural School, unlike other ordinary educational establishments, were limited to a certain number. They had a great many applications for boys, but their number was limited to 23 in his time and now he saw it was 26. They only wanted a select number of boys, who had the interests of agriculture at heart. He read in the newspapers that one of the boys had been sent from the School to the clerical examination, but he hoped that the Principal would never allow this to occur again, for the one object with which the boys entered the School of Agriculture was to qualify themselves in agricultural knowledge and to go forth and spread forth that knowledge. When he first thought of an Agricultural School, he had many discouragements to contend with, but he was now glad to find that he had successfully broken the ice. There were eleven agricultural instructors, seven of whom were paid by Government and five privately, so that all their old students were not simply employed under Government. The improved plough had done a great deal to foster agriculture, and from the reports to hand, he found that the crops had more than doubled their usual yield by the use of the plough. They had sent out their young men to work with the improved ploughs and they had all done good work. The other day he sent out a hard-working man to work in a place some 19 or 20 miles from Trincomalee. The people there were not inclined to work at first, but the speaker himself spoke to the people and told them that if they did work they could share the profits equally and so ward off starvation. At last they did set to work and they got a good return and shared the profits. He moved the instructor on to the next station, and the result was so eminently gratifying that there were several applications for the ploughs. Their object was to disseminate a knowledge of agriculture so that others might follow the example; for he found the Sinhalese people always ready to take advantage of opportunities offered to them. They wanted the young men to work. A good many had already taken advantage of employment on estates, and he was quite sure that the education received here would not be thrown away in vain. In conclusion he wished all success to the institution and wished the pupils good-bye. (Applause.)

The distribution of awards then took place accorde ing to the following list, each recipient as he came up to receive his gift being heartily cheered by hi comrades:—

SENIORS.—Agriculture, Chemistry, Botany, Zoology, Entomology, English, History and Geography, Mathematics, and Practical Chemistry (the late Mr. de Soysa's prize) all gained by J. A. Kodippily; Veterinary Science was won by A. Drieberg; and Practical Agriculture by J. P. Ranasinghe.

JUNIORS.—Agriculture and Geology by P. V. Cooray, and Chemistry, Botany, English, History and Geography, Mathematics, and Field Surveying (the Grenier prize) all by E. M. Johannes.

THE PRESIDENT'S SPEECH.

The prize-giving over, Sir E. WALKER said:—Mr. Principal and ladies and gentlemen:—It gives me great pleasure to come here today and to make the acquaintance of the School of Agriculture and to join with you by your presence in the expression of encouragement to the masters who have been engaged in teaching the boys during the past year and congratulating the boys themselves on their course of study. (Applause.) I trust that those who have received prizes today will find in them an encouragement to persevere in after life and to exercise that industry which have enabled them to attain certificates. I am not altogether a stranger to the School of Agriculture. The deservedly high terms in which Mr. Green has spoken of the institution I am well aware of, as it has been my good fortune to have been much associated with Mr. Green, and from him I have from time to time heard a great deal of the School and have been much impressed with the zeal and the interest he has taken in it. (Applause.) I think the Principal in his Report has very rightly expressed regret at his loss, but it is not a very real loss after all, for you have in his successor a gentleman who has the interests of practical education at heart. and I feel sure that he would use his best efforts in furthering the work of agriculture. (Applause) And you have Mr. Green in a position to help you at the Governor's elbow and as my principal colleague and assistant. As regards the work of the School I have heard of several accounts disparaging and discouraging the work and utility of the education given in this institution. Of course it would be difficult by statistics to show how valuable the School was, but I am of opinion from all the information I have gathered, that those boys who have been sent forth from this School into the various provinces of the island are doing good work in agriculture. (Applause.) I put the question to Mr. Drieberg when I came into the room whether during his travels about the country he had seen good work being carried on in agriculture as the result of the money spent on it, and he unhesitatingly answered in the affirmative, and I think we may take his opinion as one of considerable value. His opinion is, moreover, of an independent character, because he belongs to this country and it is not as if he were speaking of the results of his own labours, but of those who have gone before him. Some people have tried to

throw cold water over the school: but if the boys only worked quietly and persistently their labours would bear much fruit. (Applause.) The Principal has referred to a pupil who had gone to the district of Walapane. Well I know of no one who is likely to do more good to that unfortunate part of the district than one who would instil into the poor people there some knowledge of agriculture, and if he did that he would certainly accomplish more than what Government officials and Colonial Secretaries had yet been able to achieve. In conclusion I have only to express the great pleasure it has given me today in taking part in the prize-giving this year. (Loud applause.)

The Hon. Mr. J. J. GRINLINTON followed, and in the course of a spirited address urged on the School the desirability of experimenting upon the system of transplanting paddy. In some parts of the country this system was a success, while in other parts it was a failure, chiefly because in many cases transplanting took place at the wrong time and the plants died. He hoped that the matter would occupy the attention of the Principal and his pupils, for transplanting was carried on on an extensive scale with various other products, and he saw no reason why they should not carry out experiments in transplanting paddy. With regard to the remarks which fell from the President and Mr. Green that cold water was being thrown on what they did by some people, he believed that these people were everywhere in the world, and the very men who had not lifted a finger to help them and had done all they could to discourage them would whenever they heard that success did attend their efforts, say "We told you so." (Laughter and applause.) He counselled the young men not to trouble themselves about the criticisms levelled against them, but simply to work on steadily and success would assuredly follow. He was sorry to find that the Sinhalese nation were not giving that attention to cultivation which they did in the ancient days. In those days their one ambition was to possess and cultivate the land, but now the majority of the young men only tried to get educated and seek employment under Government on the smallest pittance. This, the speaker said, was what ought to be discouraged; and he thought the best thing for our young men to do was to put their shoulders to the plough and to give their attention to agriculture. (Applause). In addition to agricultural knowledge a knowledge in mercantile matters was also indispensable. He would instance the case of those gentlemen in England who were trained to agricultural pursuits in preference to a berth under Government, and he maintained that if the young men only considered the advantages to be gained from a knowledge of agriculture, they were bound to succeed in life. In conclusion the speaker proceeded to advocate technical training. The School was only in its infancy and they had heard of the success which had attended their efforts; and if success had attended efforts where difficulties had to be surmounted before, he had no doubt that a school for technical education would also meet with success. (Applause.) Without technical education the School could not prosper, and he would be very glad if technical education was brought to the very doors of the natives. (Loud applause.)

Mr. H. W. GREEN referring to Mr. Grinlinton's remarks regarding the system of transplanting said that that was the first thing he started with, as it was the system which brought out the best returns. In China and Japan this system of transplanting brought enormous folds, and even transplanting in the sandy soil at the back of the room resulted in a yield of 539-fold. Another great advantage in favour of transplanting was that 10 measures sufficed to plant out an acre of land whereas the people usually used two or two and a half or three bushels an acre. The system too could also be carried by means of a nursery in one corner of the field, and during a period of drought the cultivator would be able to water this small piece of ground from his chatty and thereby to tide over the period of drought without being starved (Applause).

The PRESIDENT said that in bringing the proceedings to a close he wished all the pupils a successful career. He might mention that in connection with the eleven students who had left the institution for the various provinces, the fact that five had been employed by private parties indicated that they had shown an independent appreciation of the worth of the School. (Applause.)

Three ahearty cheers having been given to Sir E. Noel Wlker for presiding on the occasion, followede by rounds of cheering for the Principal and the visitors the gathering adjourned to the green, where litht refreshments were partaken of: the Band of the C. L. I. V. treating the people to some excellent music.

A GIGANTIC AFRICAN COMPANY.—We believe (says Saturday's Liverpool *Journal of Commerce*) it is intended to float a very large company for the purpose of developing the resources of West Africa. The capital is to be placed at ten millions sterling, and amongst the likely promoters are the Duke of Westminster and Mr. Stanley.—*A. F. Press.*

HOW TO SELECT BANANAS.—A fruit-buyer said to me the other day—"Very few buyers know how to select bananas when purchasing them by the bunch. It's a very simple thing. Look at the thick end of the branch on which the bananas hang. If it is green the bananas will ripen slowly and lusciously and will be of good flavor. If the end of the branch is black the bananas themselves will blacken after a day or two and will ripen too fast and rot. Even if they are plucked the day after they are bought, and eaten, they will be mushy and the flavor will not be good."—*Jamaica Gleaner.*

BUG ON COFFEE.—Mr. Jas. D. Watson will not find Ceylon planters to agree with him in making light of green bug. He write as follows to a Rangoon paper:—

The coffee pests are only two in number and they are termed in plain language—"Black Bug" and "Green Bug." But they have never been looked upon as great enemies to the coffee trees, and planters know well that wet seasons had to do with their production more than anything else. But I have never found a good handful of quicklime, thrown on the trees early in the morning, to fail, and the bug left the trees as they came. Of course, the quicklime or "*caustic lime*" must be applied when the dew is on the trees, and this could always be carried on up to 8 a.m., and 300 or 400 coolies get over a good acreage in the course of that time.

KINDERED SARKASTIC.—The *Fouchow Echo*, referring to the poisoning of a tea party in England, the poisoning being traced to corrosive deposits in the urn, says:—"Worse and worse. We never did think well of Indian tea, but little did we suspect that there was actually poison in the cup. Here is a case where, owing to the accumulated deposits in the urn used for the purpose of making the tea, one hundred persons were poisoned by it! It is too shocking. That the tea used by the benevolent lady could not have been of China growth is amply proved by the fact that the Chinese never clean out their teapots, be they metal or earthenware, for the reason that a long-used teapot, never cleaned, is known by experience to add sweetness to the brew. Such a misfortune as the above would never have occurred had China tea been used. Its purity is a guarantee against such mishaps. Any deposit left is well known to be perfectly free from deleterious matter. No doubt the benevolent Miss White and the British public at large will run away with the idea that the deposits of all tea are poisonous. Poor China! it is a fresh case of the innocent suffering with the guilty."

INSECT AND OTHER PESTS: WHY THEY EXIST.

IMMUNITY OF TEA IN CEYLON FROM ENEMIES—POOR COFFEE—CURE FOR GREEN BUG—PUBLICATIONS OF THE AGRICULTURAL DEPARTMENT OF NEW SOUTH WALES—REMEDIES FOR NOXIOUS INSECTS—RUST ON WHEAT AND FRUIT TREES—LADYBIRDS AS ENEMIES TO BUGS—LOCAL APPLICATIONS.

NANUOYA, Nov. 27th.

In Miss Ormerod's works, in similar books published in America, in Dr. Maskel's book on scale insects in New Zealand, in a multitude of books of the same nature, and in the agricultural and horticultural papers and scientific reports which reach us from all parts of the world, but especially those from India, Australia and the United States, I have read carefully and noted information about insects injurious to cultivated plants and insecticides, including in the latter category insects which prey upon predaceous insects, such as "the ladybird"—

("Little fleas have lesser fleas to bite 'em");—

so much indeed as to cause me to consider the mystery of such pests in nature as phylloxera and bugs, helopeltis and red spider, and hemileia and red rust, as a mystery only second to the existence of snakes vested with venom. I suppose the mystery is to be solved only by reference to the moral revolution which called forth the declaration:—"Thorns and briers shall the earth bring forth, and in the sweat of thy face shalt thou eat bread." If there were no difficulties to encounter or overcome, men would either sink into the slough of indolence, or imitate the pride of him who said, "Behold great Babylon which I have built." At any rate, we have to fight the adverse circumstances of our natural surroundings, as well as to enjoy their favourable characteristics. As yet at least, we in Ceylon have reason to be thankful that our new staple production, tea, should enjoy so much of immunity from insect or fungoid enemies. But "the enemies of the coffee tree" seem bent on pursuing their victim to extinction. The latest and worst foe is "green bug"; and in answer to the demand for a remedy, I feel bound to repeat, as the outcome of my reading, experience and reflection, that applications should be used specially calculated to *smother* the insects to death. No doubt powerful chemical agents, especially poisons, have their use, but danger to human life as well as vegetable vitality is involved in their application, and it really seems a question whether they cannot be dispensed with. Is it not a fact that the value of a mixture of grease and sulphur as a cure for the itch-insect consists in the smothering effect of the grease and but little in the actively destructive power of the sulphur? I have just been reading with great interest some valuable publications issued by the newly created Agricultural Department of New South Wales, of which the Hon. Sydney Smith, M.P., is Minister, and Mr. H. C. L. Anderson, Director. Both have gone to work with great energy and intelligence to collect and diffuse information, summoning for this purpose the leading agriculturists and horticulturists of the colony to a conference, at which valuable papers were read and discussed, differing views and experiences compared and conclusions arrived at. Remedies for noxious insects received much attention, and I have been much struck with the simplicity as well as the alleged efficacy of some of the suggestions offered as the following out of experience obtained. One practical orchardist stated that he kept his orange and other trees clear of scale insects by an application of nothing more potent than diluted starch: diluted but of such a consistency as to form a crust over the insects and which remained over their bodies long enough to secure their death from suffocation. It would seem as if something more potent than starch or flour paste would be required to penetrate the body of the parent scale so as to reach the thousands of insects of several generations beneath, but the testimony was the starch sufficed, and, therefore, I advise a trial of rice flour, either alone or mixed with common gum (dammer?) or some viscid substance, the mixture to be sprayed or diffused by coir brushes or brooms, on to coffee bushes, and orange or other trees affected by bug, brown or green. In the case of coffee bushes, when not in fruit of course such arsenical poisons as London purple and Paris green can be applied, with much more safety to human life at least, than would be the case with orange trees bearing fruit, edible vegetables or tea leaves. Another simple recommendation was the use, as an application, of a decoction of gum (eucalypt) leaves; and an orchardist asserted that he had kept his trees free of "scale," by mulching them with gum leaves, which, when decayed were dug into the ground at the roots of the tree with good fertilizing as well as bug-resisting effects. The Australian eucalypts, especially blue gums, are now so common in Ceylon, that a decoction of the leaves and the leaves themselves as a mulch, that is as a covering for the surface around coffee, orange or other trees, can easily be tried.* If by such simple means success is not attained, then the more potent remedies (generally poisons) can be resorted to. A large proportion of such remedies were discussed at the Sydney Conference, in the light of local and general experience in Australia, as well as the large experience obtained and the comprehensive information collected in the United States, especially in Florida and California. The Codling Moth (*Carpocapsa pomonella*) so destructive to apples and pears especially formed the subject of the first elaborate paper published by the Department to which we have referred. Another apple pest, *Cacœcia postvittana*, was also noticed, the larvæ of which have been found on several native plants, including *Grevillea robusta*. Birds, lizards and frogs are enemies of these moths, and with trap bands of canvas, the spraying of Paris green or London purple is recommended, in the proportion of 1 lb. of the poison to 100 gallons of water. The application of the arsenical solution is, of course, made when the fruits are quite small. What applies to apple trees applies to coffee, only that it is the leaves and twigs of the latter which are chiefly attacked. In a paper on rust in wheat, it is stated that last year the loss of farmers in Australia from this pest, so like *Hemileia vastatrix* in general appearance, was equal to £2,500,000 sterling. No such cereal as rust-proof wheat has been discovered, but some kinds are constitution*ally* able to resist the pest, and it was recommended that wheat should follow other crops, such as maize, sorghum, &c. Of course no such remedies apply to plants perennially in the soil. For peach rust, the washing of the trees with ferrous sulphate (green vitriol or copperas,) 1 lb. to 4 gallons water is recommended; also the dressing of the *soil* with the same substance, ½ lb. for a tree, finely powdered, or dissolved in 2 gallons water. This poison can be applied to coffee trees,—with caution, of course. For the maize moth and the cotton worm, *pyrethrum*

* It is quite possible that a decoction of our coarse hill lemon grass, mana, might be efficacious as well as a mulching of the grass. In the old days of black bug, I remember wisps of mana grass being tied on the coffee stems.

extract, diluted in water, one to thirty, was found somewhat useful. A paper on microscopic nematode worms (Tylenchus and root gall) is perfectly appalling. The remedies for this pest are also good remedies for other plant diseases,—lime, and muriates and sulphates of potash and ammonium. In California, the threatened destruction of the orchards by the cottony cushion scale (*Icerya Purchasi*) the worst of all the bug tribe, was averted by the importation from Australia and the breeding and spread of "ladybirds" (*Vedalia cardinalis*). This scale-feeding insect might be tried as a remedy for green bug on coffee? There is a native "ladybird," but we do not know if it is identical with the Australian species which the Californian orchardists have found so great a benefactor. The losses caused in the United States by insects which ravage crops have been reckoned at £60,000,000 to £80,000,000 per annum! No wonder, therefore, if much capital, science and experiment have been devoted to the study of the life habits of the insects and the best means of extirpating them and of lessening their ravages, where extirpation is impossible. From an able paper by Professor Olliff, the New South Wales entomologist, I extract some valuable and suggestive passages:—

When man came to till and to cultivate, many insects which naturally fed upon the plants he grew found abundance of food, and multiplied accordingly. It has thus come about that the cultivation in large areas of one particular kind of plant has resulted in an increase of particular pests. To illustrate my meaning it is only necessary to instance the Cottony Cushion Scale (*Icerya Purchasi*, Mask,) of the orange, and the Hessian Fly (*Cecidomyia destructor*, Say) of the wheat, species which have caused immense havoc in America and in South Africa, where they have found abundance of food brought together by the orchardist and farmer. Apart from this inevitable increase of native or indigenous species, many others have been imported with plants and cuttings, and also in the ordinary course of commerce, from one country to another; for it is well known that some of the most destructive insect pests of Australia have been introduced accidentally from Europe and America and similarly some English pests came from the East, and some American pests from Europe. In these matters, indeed, a fair exchange may be said to take place, for we are responsible for sending a very troublesome creature in the shape of the Cottony Cushion Scale (*Icerya Purchasi*, Mask.) to our American cousins and to our brother colonists in South Africa. If we take only a casual glance at the destruction which occurs every year to our crops we shall perceive that if these ravages could be brought under control, by lessening the number of the injurious kinds whenever they appear in excess, the benefit would exceed anything of which we have any conception.

Of the many substances and compounds used as insect destroyers, the following are the best known:—Lime, sulphur, soot, salt, wood-ashes, corrosive sublimate, naphtha, naphthaline, turpentine, alum, carbolic acid, phenyl, cyanide of potassium, green vitriol, ammonia, alkalies, benzine, vinegar, sulphuric acid, blue vitriol (sulphate of copper), hot water, &c. Most of these may be successfully used for specific purposes either dry, in liquid, or in vapour; but the three most useful insecticides of general application in use during the early days of economic entomology in America and up to within a few years, were undoubtedly tobacco, white hellebore, and soap. Tobacco water and tobacco smoke have long been employed against Aphides and other delicate insects, and are most useful. A quite recent advance in its use is by vaporising. The vapour of nicotine is most effectual in destroying insects wherever it can be confined, as in greenhouses. Thus the boiling of tobacco in such a greenhouse is as effectual as and less injurious to the plants than the older methods of syringing or of fumigation by burning. The vapour gradually arising from tobacco stems strewn on the ground and regularly moistened is likewise effectual.

White hellebore, either in dry or in liquid, has long been one of the most satisfactory insecticides against Saw-fly larvæ, otherwise known as false caterpillars; while syringing with soap-suds will kill some soft-bodied plant-destroyers, and when used as a paint on the trunks of trees is an excellent repellent against the parents of different borers.

More important, however, than any of these insecticides are the three now most commonly used. They are—(1) arsenical compounds, (2) petroleum, and (3) pyrethrum. The first act through the stomach, and are effectual chiefly against mandibular insects, *i. e.*, those insects with biting mouths; the second and third act by contact, and are therefore of more general application, affecting both those insects with mandibular or biting mouths and those with sucking or haustellate mouths.

The use of arsenic as an insecticide in the field dates from the year 1871. At the rate of 50 grains of arseniate of soda and 200 grains of dextrine dissolved in a gallon of water and this diluted at the rate of about an ounce to ten gallons of water, it furnishes one of the cheapest of insecticides at command, and various patented combinations of it have been extensively sold and used. Again, one pound of arsenic and one pound of sal-soda boiled in one gallon of water till the arsenic is dissolved, and diluted at the rate of one quart to forty gallons of water is also a good formula. The chief merits of arsenic are cheapness and solubility. Its demerits are its white colour, which makes it liable to be mistaken for harmless substances of the same colour, and its tendency to burn the plant. Paris Green or Scheele's Green has been more extensively used than any other arsenical compound, and is, on the whole, one of the most satisfactory insecticides.

A refuse obtained in the manufacture of aniline dyes, and known as "London Purple," is the third important arsenical compound.

It is used with diluents, either wet or dry, in the same manner as Paris Green. For some insects experience has shown it to be less satisfactory than Paris Green; for many others it is equally effective, and has the great advantage over Paris Green of being cheaper; of covering twice the ground, weight for weight; of being more soluble, less poisonous, more adhesive, and permanent in its effects.

The following receipt is recommended by Dr. Riley for certain pests, and other applications will suggest themselves:—Forty gallons of water, $\frac{1}{4}$ to $\frac{3}{4}$ lb. of London Purple (or $\frac{1}{2}$ to 1 lb. of Paris Green), three quarts of flour, [N. B.] the solid ingredients intimately mixed with the water by washing them through a strainer, sprayed upon the trees by means of a force-pump and nozzle, was found to effectively destroy web-worm. The effect of the poison is sometimes not observable until after three or four days. Care must therefore be taken not to overdo the spraying.

Petroleum, in its various forms, has long been recognised as one of the most effective insecticides known, all oily substances being particularly deadly to insects. Unfortunately, they are also injurious to plants, and they can then therefore only be applied after the discovery of suitable methods of diluting them so as to kill the insects without injury to the plants. Refined kerosene has been used to a limited extent, by forcible attenuation in water and spray, while some plants withstand doses of the pure oil Of the various substances used in attempts to emulsify and mix kerosene with water, none are more satisfactory than soap and milk. An emulsion resembling butter can be produced in a few minutes by churning with a force-pump two parts of kerosene and one part of sour milk, or soap solution, in a pail; emulsions made with soap solutions being generally found to be the more effective. The liquids should be at about blood heat. This emulsion may be diluted with from nine to fifty parts of water which should be thoroughly mixed with one part of the emulsion.

The strength of the dilution must vary according to the nature of the insect to be dealt with, as well as to the nature of the plant; but, finely sprayed in twelve parts of the water to one of the emulsion it will kill most insects without injury to the plant. The spraying should be done by a force-pump through

cyclone nozzles; it is best done in the cool of the day, and where possible, in calm or cloudy weather; two or three sprayings at intervals of a few weeks being preferable to a single treatment.

The following is a good receipt:—Two parts of oil to one of soap solution or milk (the soap solution being made by dissolving from a quarter to one pound of common soap, or whale-oil soap, in one gallon of water). The whole is violently agitated, at a temperature of about 100° F., by driving it backwards and forwads through a spray nozzle. The emulsion thus formed is diluted with nine parts of water. Flour or resin soap-wash is sometimes added to the kerosene wash, to give it greater adhesiveness, [N.B.] and 4 or 6 ounces of arsenious acid (or half a pound of arsenic, half a pound of sal-soda, boiled in half a gallon of water till the arsenic is dissolved, or half a pound of London purple) is sometimes added to each 100 gallons of the wash, to render it more effective.

Pyrethrum roseum and *pyrethrum cinerariæfolium*, two plants, natives of Asia and Europe respectively, have long been known to possess insecticide properties, especially the powder from the dried and pulverised flowers. This powder can be used in liquid solution and its action on many larvæ is marvellous, the smallest quantity paralyzing and ultimately killing. As the insecticide property dwells in a volatile oil its influence in the open air is evanescent, in which respect it is far inferior to the arsenical products; but, being perfectly harmless to plants, it can frequently be used on vegetables where the more poisonous substances would be dangerous.

Of all insecticides to be used against root-feeding insects naphthaline, sulpho-carbonate of potassium, and bisulphate of carbon are the chief. It has recently been shown that napbthaline in crystal may be satisfactorily used under ground, destroying by slow evaporation. But bisulphide of carbon still holds the first place in France against *Phylloxera vastatrix*. Large quantities of the latter are now imported from England into Capo Colony for the purposo of treating the phylloxerated vineyards.

In the above extracts is summarized most of the information available regarding insecticides and their application. But as in Ceylon we have to deal at present specially with the green scale insect on coffee, I would repeat my recommendation for a trial of the simple remedy of rice flour mixed with water and gum or some viscid substance, applied of such a consistency that it may adhere to and kill the insects by asphyxiation. Essence of leaves of gums and mana grass might be added to the mixtures, or decoctions containing their acid and volatile oil properties might be sprayed on the bushes, after the adhesive matter has been on for some days, or at alternative intervals. For application the "straweonizer" promises to be useful, but a hand-pump with a nozzle will answer, or where the affected patches are limited, coir brushes might suffice. So much for the present, but I may recur to the subject.

INSECT AND FUNGOID PESTS AND THEIR REMEDIESS—HOW TO CONQUER GREEN BUG—BIRD ENEMIES—HARE—FLYING-FOXES—MONKEYS—RATS.

To revert to the N. S. Wales papere on insect and fungoid pests, it is stated that oïdium on vines can be fought with finely powdered sulphur, while a paper by a German scientist ie quoted, showing that the destruction of vines affected by *Phylloxera vastatrix* could be obviated by insertion amongst the vines of tubular poles, down which creosote wae poured into the earth, so reaching and klling the insects. A small midge-like fly which attacked vines, peaches and other fruit trees was destroyed (as was the foliage and fruit) by a solution of carbolic soap mixed with tobacco juice. Had a viscid preparation such as birdslime been applied, the fly might have been killed without the sacrifice of the leavee and fruit. Mr. Scobie, M.L.A. stated in a paper on peete:—

Of insect pests, in their different metamorphoses, we have the grape caterpillar (*Agarista glycine*), mottled red and white; also a large green kind; two kinds of grape grasshoppers; the boring grub in fruit-trees three kinds; the elephant beetles (*Orthorrhinus cylindrirostris*), also borers in the larval stage; and a smaller variety even more destructive than are the larger ones; two kinds of cicadæ, large and small; two kinds of beetles, small, which attack China peaches principally, American blight and codlin moths on apple-treos, and the aphides on orange and peach trees.

The red-and-white caterpillar has been very numerous of late years, destroying whole vineyards for a season by eating up all leaves and fruit. The large green kind has not been so numerous but is of the same habits. Both kinds of grasshoppers attack the foliage almost from its first start; they hatch about the same time as the first sign of growth appears, and then spoil the young bunches till berries form, and again they nibble the skin of the berries when ripe, making them turn into raisins in a dry time, and mould at other wetter time. They also eat pieces out of much of the tree fruit in the same way.

The boring grub or borer pierces the limbs of trees, and lives on the bark, making a cover of its dry excrement, under shelter of which it works, and when disturbed goes backward into his hole. A small variety of a dark colour has much the same habit, but generally takes advantage of some small crack or knot to afford it cover, or otherwise eats its way into the pith of the smaller branches, if there be no other way by which it can get in, such as where a pieco has been broken across or cut off. The large boring grub, which works in the trunk or large limbs of old trees, apparently living on the juice of the wood operated on, changes to a very large beetle with long feelers.

The larger kinds of elephant beetles are very destructive to old vines. The grub of this beetle lives on the sap of the wood of the vine during winter. In spring it changes to the beetle form, eats its way out of the vine, then travels about and lives on the buds even before or just as they begin to show the first sign of life. Sometimes they eat a hole in the centre by inserting their trunk, but mostly eating the eye clean up. Sometimes a beetle will travel completely round a vine, eating out every eye, thereby destroying all prospect of fruit. Even after the shoots are well advanced a great many break off because of being partly or wholly eaten through. The grub is readily found when one is pruning, as often, when a little strain is put on the branch operated on, it will break in consequence of the inside wood being so much burrowed through. The smaller and even more destructive variety—more destructive because of its greater numbers and different mode of attack—has only been known to us within the last ten years or so. It makes its appearance just as the vines commence budding, having apparently come to maturity in the ground, for there is no sign of this sort having bred in the vine. It creeps up the vine stock, and simply punctures the buds with its trunk, and if not carefully taken off will spoil the crop. It is about the size of a wheat grain, sometimes larger, and of the colour of the bark, and it takes a practised eye to detect it. Both varieties can fly, but wherever this latter variety appears it spreads slowly and surely, and, notwithstanding our best care, is increasing. Hand-picking is the only remedy we know of.

The two varieties of the beetle which attack the fruit, principally the China peach, are well known, and I will do no more than mention them.

The well-known cottony aphis, or American blight, is familiar to all apple-growers, the dark aphis on orange-trees to orange-growers, and peach aphis to peach-growers; and we have many varieties of scale insects all more or less injurious.

When to all the above the deadly *phylloxera* is added, it will be seen that the Australian vignerons and orchardists have a severe battle to fight with insect enemies. One orchardist stated that the

codling moth destroyed 90 per cent of his fruit. Another orchardist stated:—

I have tried various remedies, viz., kerosene and water—1 of oil to 16 of water—syringed on cold, which kills insect pests, but I thought the oil stopped the pores of the leaves, and so somewhat injured the trees; I have also tried tobacco with sulphur, lime, and other remedies, but after experimenting for years I find that a mixture composed of soft soap—made with whale oil—blue oil, and sulphur is the best; sulphur and soap boiled together, oil added after, and syringed on to the trees at a temperature of from 140° to 145° Fahrenheit; if done during dry weather the trees should be syringed with cold water half an hour before using the mixture, so that the latter will adhere or be the more readily absorbed. I find that this mixture, put on properly, will destroy red and white scales, elephant beetle or borer, and all insect pests that I have had to deal with. If trees are badly affected they should be dressed in November, and again in early autumn. Scales multiply faster during autumn than any other time of the year.

But we must quote in full the short but very important paper on the starch remedy,—the remedy of commonsense, and therefore of science, for scale insects:—

RED SCALE ON THE CITRUS TRIBE: HOW IT MAY BE EASILY AND INEXPENSIVELY REMOVED.

The following paper was sent in by Mr. J. Patterson, Tamworth, and was read by the Director of Agriculture:—

I have had occasion to use many insecticides for removal of red scale from orange and lemon trees, and I find that the simplest and most effectual is starch. It is prepared in the following way: 2 lb. of the ordinary household starch are dissolved in a little cold water, then about 2 quarts of boiling water are poured over the starch solution, and stirred until it is thoroughly mixed. Add to this 16 gal. of cold water and stir well. The insecticide is now prepared and ready to be applied to the trees.

The insecticide should be applied with a syringe when the trees are small, or with a spray pump, when the trees are large, and it will cause the following result: The foliage and fruit receive a coating of the starch solution, which adheres to the foliage and fruit, and smothers the scale, and in a few days it will come off in flakes, bringing with it the scale, leaving the foliage and fruit as bright and clean as if the trees and fruit had never been infected with scale.

The insecticide should be applied during sunshine, so that it may dry quickly, and adhere to the foliage and fruit, and carry out its destructive work as intended.

After the trees have been thoroughly treated with the insecticide they should receive top-dressing of stable manure to be dug in the following season, and the cultivator will find that his trees will produce large crops of superior fruit, and will repay him for the labour expended on them.

The grand merit of this application is that while fatal to the insects, it inflicts no injury on tree or foliage. Benzole, which will not mix with water, and "Quibell's insect destroyer" (?) when sprayed, killed the fly on vines and other fruit trees. So in regard to oïdium. Grasshoppers or locusts are as destructive in Australia as in America. When we visited the St. Hubert vineyard in Victoria, grasshoppers were so thick on the earth that they rose in dense swarms as we walked between the rows of vines. It is curious to read that castor oil leaves and larkspur are inimical to these insects. One farmer destroyed millions by putting down straw for the grasshoppers to lay their eggs in, to which he then set fire. The same farmer was troubled by an insect, resembling the Jordan louse, and he said:—

A friend advised him to strip the trees down to the main roots, and to watch the stems carefully. He followed out the suggestion, and soon found out what it was that was killing the trees. The little insects came out in thousands. He made inquiries in order to find out a remedy. He tried 3 oz. of sugar of lead, dissolved and mixed with a gallon of strong whitewash (ordinary lime and water), and, with this mixture, he painted the stems of the trees, and the pest was eradicated.

Our strong belief is that painting with lime alone would, in this case, have been effectual. A member of the conference referred to the peach blight and uttered good commonsense about applying common clay to affected trees:—

A remedy he advocated was to keep the trees warm, and to paint the trees in the winter with a composition of lime and sulphur. This prevented the birth of the aphis in the early spring. Where a tree was badly affected, every bud should be brushed with an emulsion. For the woolly aphis pest he had heard that some gentleman on the Western line had discovered a sure remedy. Many nostrums were recommended for this pest, including kerosene emulsion. In the old country, in his younger days, a simple remedy was used. Clay was mixed with water to a fair consistency, and applied with a stiff brush to all the knobs which appeared on the tree. This was found to answer better than any of the expensive compounds now advocated, and he still used it.

Another fruit-grower said:—

The application of different specifics stayed the pests only for a short time, and the best mode of treatment was to wash the tree well with soapsuds, and then to apply a mixture of boiled oil and sulphur. This paint stayed the blight for fully six months in the year.

Again:—

Dr. Fiaschi, Richmond, said he had had some experience of the woolly aphis blight. An apple-orchard of his was so badly affected with it that he never could get a crop of fruit. He had tried all the remedies suggested, with the exception of liquid clay, proposed by Mr. Gelding. Heavy manuring was one of the treatments he made use of, but it altogether failed. Last year he had intended to have the trees rooted out, and to plant the land with vines, when a gentleman gave him a bulletin of the Californian State Board of Agriculture, wherein was suggested a summer remedy for pears and apples. It consists of the following ingredients:—Caustic soda (98 p.c.) 10 lb., potash 10 lb., tallow 40 lb., resin 40 lb. The directions given with the recipe were—First: Dissolve the potash and soda in 10 gallons of water, and when dissolved place the solution in a barrel (50-gallon measure.) Second: Dissolve the tallow and resin together; when dissolved add the same to the potash and soda in the barrel, and stir well for five minutes or so. Leave standing for about to hours, then fill up with water, stirring well as every bucket of water goes in. Use the following day one pint to a gallon of water, and apply warm. He tried this specific, spraying the trees with it, and he obtained a splendid crop of apples. As to *oïdium*, he did not think there was any cure for it.

Another expression of opinion was:—

It was of no use attacking the insect with poisons—they must stop its breeding. The fine starch mentioned by Mr. Patterson would be fatal, and Mr. Pye had found an application of soap mixture successful.

One gentleman said:—

Had sprayed the trees with a common syringe, with a mixture of unslaked lime and sulphur, three parts to one. If slaked lime were used it would be necessary to boil it, but by using unslaked lime the mixture boiled itself, and thus saved much trouble. It proved better than a kerosene emulsion, because it killed all the moss which grew upon the trunk of the tree.

As a friendly insect, in addition to the "ladybird," the mantis, or "native lady," was mentioned. Again:—

Mr. Bradbury cautioned the Conference as to the use of dangerous poisons as remedies for pests. He suggested that, if poisons were resorted to, some steps should be taken to prevent the use of arsenic and strychnine by ignorant persons, for if only one or two were poisoned confidence in Australian fruit would be destroyed for years. Scheele's green, which had been mentioned, was a preparation of arsenic; and

so were other specifics which were occasionally used. One gentleman had recommended acetic acid, but it was not necessary to use such poisonous chemicals; there were a number of remedies less dangerous and equally as effective. London purple was an aniline product of coal tar. * All coal tar compounds were effective. Naphthaline and creosote were cheap, but difficult to use. Creosote was not soluble in water, but it was possible to make an emulsion of it with alkalies. Tobacco and nicotine were largely used as specifics, but they were too expensive. A mixture of caustic soda, tar, and resin had been suggested as a cure for apple blight. The first-named ingredient was a dangerous thing to have in the household, and the mixture, when prepared, was merely a resinous soap which could be purchased for a few pence, and thus all trouble and danger would be saved.

Mr. Stiemo inquired what strength of kerosene spray was required for the mussel blight (*Mytilaspis pomorum*).

Mr. Thompson replied that the emulsion was prepared in this way:—To one gallon of milk, brought up to boiling point, add two gallons of kerosene. If preferred they could use half a pound of soap to a gallon of water, brought to boiling point, and the kerosene churned in that for some time. This, with nine or ten times the quantity of water, could be effectively applied with a common cyclone-nozzle.

The digging in of ashes round the roots of trees was said to prevent pests. I have quoted very largely already, but to make the information on insecticides complete I must add the following summary of the results of very dearly bought experience in America as to the best remedies for pests:—

INSECTICIDES.

The following notes by Dr. J. C. Neal, the Entomologist to the State Agricultural College, Florida, U. S. A., will be found of interest:—

Nothing has been done in practical entomology that has shown better results than the use of emulsions containing kerosene or insoluble poison held in suspension, and their application to infected plants in a fine spray by various atomizers and spray pumps. With one of these machines an insecticide can be brought into contact with the insect, and its feeding ground thoroughly impregnated with poison. It is needful that the spray be very fine, and that it be applied with force to reach every infected part, or the hiding-places of insects. For cases like infected buildings, as chicken-houses, that are usually very difficult to keep clear of mites and tick-fleas, the spray of carbolized whitewash, tobacco, kerosene, oil of tansy, &c., is easily applied.

I append a few formulas that have been tried and found to be valuable:—

I. SOLUTIONS.

1. Tobacco, 1 lb.; boiling water, 3 gallons, strain when cool. Very effective when used as a spray against flees, beetles, lice, aphides (plant lice), and ticks.

2. Quassia chips, 1 lb.; boiling water, 3 gallons. This very bitter solution is good for prevention rather than cure. Apply as a spray to rose bushes and to kill plant lice.

3. Pyrethrum: 1 ounce of the "Buhach" powder added to 2 gallons of cold water for cabbage, beets, tobacco, or any plant used for food, as this is not poisonous.

4. London purple, Paris green; actively poisonous. Use 1 lb. of the poison to 200 gallons water or other solutions. Dissolve a little flour paste in the water to make it sticky. Stir frequently. Applied to trees, it is a sure cure for all insect plagues.

5. Bordeaux mixture: this, while primarily a fungicide, has some good qualities as an insecticide. It is prepared thus: 1 lb. sulphate copper, dissolve in 1 gallon hot water in one vessel; in another, 1 lb. rock lime is slaked in 1½ gallons *cold* water, and, when cool, pour into the copper solution and strain; add 2 gallons water, and it is ready for use. (Cook.)

6. To this, add London purple, 1 lb. to 200 gallons of the Bordeaux mixture. This sprayed over non-bearing grape, vines or tomato vines not in bloom, &c., will prevent rot and insect life as well.

7. Soap: 1 lb. resin soap to 1 gallon hot water. This, used as a spray, is often a valuable remedy for the attacks of small and soft insects. In fact it can be used to advantage for soft scales, when they are few. It should be often used to get the best effect.

8. Water in which tar has been placed acquires some value as an insecticide.

II. EMULSIONS.

(Soap is used as the basis of most of these.)

1. Stronger emulsion of kerosene: 4 lb. soap, dissolve in 1 gallon hot (boiling) water; remove from the fire and add 2 gallons kerosene while hot. Churn with a spray pump violently till the oil is emulsified; add 27 gallons cold water for use.

2. Weaker emulsion (Cook): 1 lb. soap, dissolve in 2 gallons hot water as before, but add only ½ gallon kerosene and dilute till 8 gallons solution are made. Adding ½ pint spirits turpentine to No. 1 increased its stability (Tracy). Allowing even 40 gallons of water to be added to 1 gallon of the emulsion and sprayed on tomato worms, it was very effective, and did not injure the plant in the least.

3. Emulsion 1: Adding 2 oz. of balsam of fir with the kerosene makes an emulsion that adheres better to the surface of leaves, and is slightly superior to No. 1 for tho armoured scales.

4. Using emulsion 2, only substituting the same quantity crude carbolic acid for kerosene, is especially valuable for oak and pear insects.

5. The same formula, using oil of tansy or sassafras 1 oz. in place of the ½ gallon kerosene, is efficacious for roaches, mites, ticks, bed-bugs, and pests.

III. ARSENICAL, RESINOUS, AND OTHER COMPOUNDS FOR SPRAYING.

1. To kerosene emulsion No. 1 add 1 oz. London purple, and mix well. Highly recommended.

2. Resin compound: Caustic soda, 1 lb.; resin 8 lb.; to make 32 gallons compound. Dissolve the soda in 1 gallon boiling water; take out half; add the resin slowly to the remainder and boil, stirring rapidly; when dissolved, add slowly the part taken out. Dilute till it will pass readily through a thin cloth, which should be always done. Dilute before using to 32 gallons. This alone is very valuable against most scales, but the addition of 2 oz. London purple makes assurance doubly sure against even the dreaded *Icerya*.

3. White arsenic, ½ lb.; sal soda ½ lb.; water, ½ gallon; boil till a solution is made, then dilute to a gallon. 1 quart of this to 50 gallons resin compound—use on peach, pear, and plum, either after fruit is gathered or just as bloom has fallen.

IV. POWDERS.

1. While slaking 1 peck fresh lime, add 1 quart kerosene, sift out lumps; apply lightly to cucumbers, melons, and tomatos, for beetles and squash-bugs.

2. 50 lb. land plaster, mix 1 pint crude carbolic acid; sprinkle over leaves and vines for aphides and beetles.

3. Pyrethrum: This, the powdered flowers of the pyrethrum, when fresh, is especially valuable if sprinkled on infected leaves, or in boxes, drawers, &c. House flies and mosquitoes are easily subdued by closing up the room tightly and slowly burning in it a spoonful of the powder. It is slightly narcotic, but not at all dangerous to human life. For infected cabbage, lettuce, celery and the like, or tobacco, it is the best insecticide we have, involving no danger if eaten.

* London Purple is a refuse obtained in the manufacture of aniline dyes, and consists of lime, arsenic, and carbonaceous matter. It was first used against insects in America in 1878, and is there much prized on account of its cheapness as against Paris green which costs twelve times as much. It is more soluble. less poisonous, more adhesive and permanent in its effects, and of a decided colour. It is now imported by Elliott Bros., O'Connell-street.—*Editor.*

4. Tobacco: This insiduous narcotic is valuable in the destruction of plant-lice, mites, &c. Applied as a powder or by its fumes it often is quite beneficial.

Bisulphide of carbon, like chloroform, is highly volatile, but its vapour, unlike that of chloroform, is very explosive. Bins and corn cribs can be easily rid of ants, weevil, rats, mice, beetles, &c., if the room be made air-tight, and occasionally filled from the top with the vapour of bisulphide of carbon. This is the only way in which our farmers ever will keep corn, peas, &c., from insect attacks.

Of course kerosene and such arsenical poisons as Paris green and London purple are chemically active, but for the destruction of green bugs, if we were troubled with the pest, we should feel much inclined to try a decoction of gum leaves and mana grass, brought up to a sticky consistency by mixing starch or flour, gum, clay and lime, with some sulphur added. If a covering of this stuff were applied to the green bugs in dry weather and left on for a few days, I believe the parent scales and their enclosed progeny would be smothered to death and come off in flakes with the preparation. If inclined to stick, the application and the insects could be washed off, with water, or a decoction of gum leaves or coarse lemon grass.

In Australia the fruit growers have other enemies than insect or fungoid pests to contend with. One authority states that birds, including the improved sparrow, are still worse, insectivorous birds often feeding on friendly insects, such as the mantis. Imported hares, too, are hurtful, but most destructive of all are perfect clouds of the large frugiverous bat known as "the flying-fox," which are so cunning that it is difficult to lessen their numbers by powder and shot or even dynamite. Neither birds nor bats, I believe, have ever been known to meddle with coffee berries, on which however, monkeys and jackals have been known to feed, while the jungle rats in one year destroyed £10,000 worth of coffee in the region whence I write. Bandicoot rats have occasionally rooted up a few tea trees; but, on the whole, it is seldom that so large an expanse of one cultivation as the tea fields of Ceylon compose has been so little affected by injurious animals, birds, insects or fungi. Long may this happy immunity continue!

HE DIFFERENCE IN THE RAINFALL AT THE BEGINNING AND THE END OF NOVEMBER—THE RAINFALL AT NUWARA ELIYA, HAKGALA AND ABBOTSFORD AND OF OTHER PLACES—EXPLANATION OF DIFFERENCES IN RAINFALL—VARIATIONS IN MEAN TEMPERATURE AND IN MAXIMUM AND MINIMUM SHADE TEMPERATURE—HEAT IN THE SUN—NOCTURNAL RADIATION—CEYLON "PEAT"—THE ALLEGED DISCOVERY OF BITUMINOUS COAL AND ANTHRACITE ON ROTHSCHILD ESTATE—HOW TO TREAT PEATY SOIL—EFFECTS OF A HAILSTORM ON TEA AND CINCHONA—HAIL IN INDIA AND OTHER COUNTRIES—CAUSES OF HAIL—CHANGEABLE WEATHER.

NANUOYA, Dec. 1st.

This morning I mentioned the contrast between the early portion of November, when we were all asking "What has become of the north-east monsoon?" and the latter portion, of the month during, which the answer has been emphatically given in the shape of thunder-and rain-storms, with occasional semi-gales of wind. The figures for rainfall and rainy days will show how striking the contrast has been. From Nov. 1st to the 16th, rain fell only on 5 days and on three of these the measurements were only 5 cents on 2 days and 2 cents on 1, the total for the 16 days being only 75 cents of an inch. From the 17th to the 30th, on the other hand, the rainfall, on 11 days has been 8·80 inches, 5 out of the 11 rainy days giving such storm quantities as 1·38, 1·47, 1·36, 1·48, and yesterday 2·09. This latter burst sent the rainfall of November up to 9·55 against a 7 years' average of 7·37; the total for the 11 months of the year being 85·93, against an average of 84·32. We are thus 1·61 inch above our average quantity, while our rainy days number 190 against 192. Unless, therefore, December turns out an abnormally rainy month, we are likely in 1890 to realize very closely our 7 years' annual average of 92·11 inches of rainfall on 209 days: only slight rain falling on fully one fourth of the number. At an elevation of about 5,800 feet and facing the south-west, this gives us 5·14 inches more than Hakgala (altitude 5,581 and facing the north-east) receives and 5·95 less than is deposited at Nuwara Eliya, which is situated between the two monsoons, at an elevation of 6,240 feet above sea-level. The averages of the three mountain stations are:—

Nuwara Eliya	6,240 feet	98·06 inches.
Hakgala	5,581 ,,	86 97 ,,
Abbotsford	5,800 ,,	92·11 ,,

There is here a graduation according to elevation, but the principle by no means holds generally g ood the river valleys below the three stations getting from 100 to 150 inches of rain, while the ranges which face the south-west monsoon, at an elevation of 3,000 to 4,500 feet, get 200 inches up to 250. Theberton estate, Maskeliya, with an annual average of 217 inches, is only 3,315 feet above sea-level, while Padupola, believed to be the rainiest station in Ceylon, is still lower down. The region round about Nuwara Eliya, protected from the extreme moisture of the south-west monsoon vapour-clouds by the Adam's Peak ranges, is fortunate in enjoying the happy mean for tea cultivation of 100 inches down to 80. Even 70, well distributed, suits this most cosmopolitan of plants.

The disproportion of rainfall to elevation is easily explained by the relative positions of mountain ranges to the course of the sea-vapour-laden monsoon winds, but it is not so easy to understand the varying rate at which MEAN *temperature* decreases with varying altitudes. The difference of level between the observatories at Colombo and Nuwara Eliya is 6,200 feet (the Colombo observatory being 40 feet above mean sea-level), and the reduction of mean temperature, in proportion to ascent, is from 80·7 at the sea station to 57·7 in the mountain sanatorium, a fall of 23 degrees, or 1 degree for every 269 feet of altitude. This fairly agrees with the formula we have seen in books on meteorology. But when we come to compare Colombo with Hakgala at 5,581 feet, with a mean temperature of 61·2, the reduction of temperature is only 19 5, or 1 degree for each 291 feet. The higher temperature in this case, compared with Nuwara Eliya, apart from difference of elevation, may be due to the fact that the great isolated mountain is densely forested, and faces the warm valley of Uva? But Badulla, 2,225 feet altitude and 72·8 mean temperature, is *in* that warm valley, and yet the reduction of temperature, as compared with Colombo, is in this case 8 degrees, or a fall of 1 degree for every 273 feet. Very different indeed is the case of Kandy, elevation 1,696 feet and mean temperature 75·9. This is only 5 degrees lower than Colombo, or only a fall of 1 degree in 332 feet, against 269 in the case of Nuwara Eliya. Can this great difference be due to the sheltered position of Kandy and the heat of the sun reflected, during the day, from the white, quartzy sand of the roads and the undarkened whitewash of the houses? The differences, hitherto, in the rate of depression for altitude have not been excessive, but we are utterly puzzled when we come to compare Badulla with Kandy. For an elevation higher by only 529 feet, the fall in

temperature, at Badulla, is 3 degrees, or 1 degree for every 176 feet! I suppose radiation of heat into space in the clear weather which so largely prevails on the wide plain in which Badulla is situated, and evaporation from the surrounding paddy-fields, affect the minimum temperature largely and so reduce the mean? But what a contrast when we come to compare the low mean temperature of Badulla with the comparatively high mean temperature of Hakgala. The higher elevation of the great Uva mountain above the capital of the Province is no less than 3,356 feet, and yet the temperature is lower only by 11 degrees, or only 1 degree for every 305 feet. Against this we have so rapid a fall as 1 degree for every 165 feet, for the 669 feet which Nuwara Eliya is higher than Hakgala: Nuwara Eliya being 4 degrees colder. We cannot doubt that the more intense cold in the case of the sanatorium is due to its situation in a grassy, damp plain, favourable to the reduction of temperature by radiation of heat into space on clear nights and the large evaporation of moisture by means of the tropic sun-rays, and of winds which, in the north-east monsoon months of December to March, are frequently quite dry and therefore ready to absorb all the moisture they meet. Hakgala, on the other hand, besides the influence of the warm valley of Uva and its lower elevation, is clothed with forest; so that, where the observatory is situated, radiation and evaporation are both at a minimum. Of course forest and forest land cleared and planted, in Nuwara Eliya, have warmer temperatures than the exposed position where the observations are taken. The proof of this is the wonderful luxuriance with which tea grows on the edges of the ancient lake basin, up to 7,000 feet on the slope of "One Tree Hill." The final average of all the varying deductions I have drawn from the Ceylon Meteorological Report for 1889, is a fall of 1 degree for every 258 feet of altitude, against the 269 feet for every degree of lowered mean temperature between the two stations of Colombo and Nuwara Eliya. Taking the round number of 1 degree for 270 feet, the mean temperature of the summit of Pidurutalagala, the loftiest point in Ceylon, may be taken at about 50 degrees; of the summit of Adam's Peak, 52 degrees. Considering the prevalence of cloud, the minima of the mountain tops may not be lower than the minimum of Nuwara Eliya, where freezing point is occasionally attained on clear nights. If our calculations are approximately correct, the difference of mean temperature, between Mannar with 81·5 (the highest *mean* temperature recorded) and Pidurutalagala summit is 31·5; between Colombo and the culminating height, 30·7, and between the capital and the "Sri Pada" on Adam's Peak, 28·7. These are approximations founded on the known differences of *mean* temperature, between Mannar with the highest observed mean of 81·5, and Nuwara Eliya, the lowest, with 57·7. Maximum shade temperature is quite another matter. The highest at Mannar in 1889 was only 98·5 in September. But Trincomalee with a mean shade temperature of only 80·7 (exactly the same as Colombo) occasionally exceeded 100 deg. in six out of the 12 months of 1889, the extreme of 101·7 being attained on May the 12th. For extremes of heat, therefore, Trincomalee takes the lead of all stations in Ceylon, although inferior to Mannar for sustained average heat. Contrasted with the maximum shade temperature at Trincomalee in 1889, we have the Nuwara Eliya minimum of 36 deg. in January. When we come to "heat in the sun"=what the meteorologists call "Equilibrium temperatures of solar radiation," but about which they do not feel by any means so confident as in regard to shade temperature, we actually get a maximum of 165 degrees at Jaffna and 164 deg. twice at Trincomalee, once at Anuradhapura and once at Vavuniyanvilankulam in 1889. That represents, approximately, the amount of sun-heat which finds its way to the surface of the earth through its atmosphere. The contrasts to such figures for solar heat are those for "temperature of nocturnal radiation," the minimum of which at Nuwara Eliya in January and December was 32 deg. against 37 deg. at Hakgala in December, and 62 deg. at Colombo in January. But I must defer further notice of the interesting Report on the Meteorology of the island for 1889, issued from the Surveyor-General's Office, because, before returning "from the Hills," I must answer as I can the following question respecting the best mode of cultivating "peat":—

"Can you name me any book in which I could obtain any knowledge of peat and its culture? Dr. Angus Smith of Manchester I believe read a paper on the subject some time ago."

The pseudo-peat of Ceylon was, no doubt, specially meant, a substance which exists in varied conditions from the fairly good deposits at Muturajawela, near Colombo, up to the more or less decomposed reeds and rushes and grasses in the ancient lake bed of Nuwara Eliya. We have not, to my knowledge, true peat or lignite in Ceylon, and I await further information as to the alleged discovery of associated bituminous coal and anthracite on Rothschild estate, Pussellawa. A small fragment which I procured and sent to Mr. Alexander Murray was pronounced by that gentleman to be anthracite. But if the small specimens produced are not due to the action of fire on British coal used on the estate, we surely might expect that, ere now effectual measures would have been taken to set at rest the reality or reverse of an alleged discovery (in which Mr. LeMesurier has faith, but which Mr. Geo. Armitage, I believe, doubts) calculated, if real, and if the substance should be found in quantity, to be of such immense value to Ceylon, especially to its staple tea industry. About the alleged Rothschild coal discovery, more will, no doubt, be heard; and meantime, to return to a much lower carboniferous formation which we have in Ceylon, as a preliminary to answering the question fully I told my correspondent that he could not go wrong in resorting to drainage and the application of lime. That is what is mainly desiderated in the case of the peaty swamps of Nuwara Eliya and the upland savannahs generally. Of course if forest soil could, at any ordinary expense, be added, so much the better. In any case the drainage and turning over and aeration of the swamp soil and the burning of portions into ashes to be applied to the rest would be certainly beneficial. I have not seen the recent paper on peat culture, to which I was referred, and I have not the most recent authorities here to consult, but I feel certain that I have indicated the main principles of treatment: drainage, aeration, lime, ashes and, if possible, fresh soil or clay. Bone dust, superphosphate, and even sulphate of lime, if they could be afforded, would be still more valuable additions to the peaty humus. In confirmation of my views, I find on referring to Johnston and Cameron's Elements of Agricultural Chemistry and Geology, 11th Edition, 1878, the following passage: "We know that by draining off the sour and unwholesome water, and afterwards applying lime and clay, the surface of peat bogs may be gradually converted into rich corn-bearing lands." The process thus described was very familiar to me in my youthful days in the Highlands of Scotland, where vast expanses of moors and mosses, in the

Black Isle (Eilandhu) of Ross-shire were redeemed by the application of clay found close at hand and lime imported from "the South." The clay from which bricks have been made at Nuwara Eliya could be utilized for redeeming the peat land, and if some of the clay as well as some of the peat could be burnt and the carbonized matter or ashes applied as a surface dressing, so much the better, I venture to say. And some of the superfluous peat in the swamps thrown up from deep drains could also be used with advantage in forming composts for the Nuwara Eliya vegetable and fruit gardens and even the tea estates. There can be no better absorbent of excrementitious and ammoniacal matters than dried peat, or peat ashes. In the work I have referred to the constituents of a peat compost are thus given :—

Dry earthy peat ...	40	bushels.
Ammoniacal liquor from gas works	20	gallons.
Bone dust ...	7	bushels.
Sulphate of magnesium ...	1	cwt.
Sulphate of sodium ...	7	bushels.
Common salt ...	1½	cwt.
Quicklime ...	20	bushels.

These materials were, by a Mr. Fleming, mixed together and put into a heap, allowed to heat and ferment for 3 weeks, then turned and allowed again to ferment, when the compost was ready for use. On referring to the *Penny Cyclopedia*, I find that eighty years ago Lord Meadowbank gave directions for a rich peat compost, by means of alternate layers of peat and farmyard manure, rotten fish and other animal matter of all kinds being added and lime or ashes being scattered over the heap before being covered up to ferment. The principles in each case are the same, the special value of the peat consisting in its absorbent qualities.

The great object in Nuwara Eliya, of course, will be to convert the swamps into grass lands : meadows or lawns ; and for this purpose, drainage and levelling will constitute the main preparations, a comparatively slight surface application of lime and clay sufficing. For the cultivation of vegetables and of fruit and ornamental trees, more elaborate and expensive treatment may be necessary. The peaty formations near Colombo were in the coffee factories used, mixed with coffee chaff, for steam engine furnaces, and the peaty stuffs in Nuwara Eliya and upcountry generally might be useful in tea factories, if compressed in moulds, turned out and dried like bricks, or rather like the forms in which fuel peat is prepared in so many parts of the world. Peat might also be used to absorb and deodorize petroleum, when used as a fuel. Peat-litter is valuable in stables and when thus saturated with ammoniacal matter as manure for gardens. Peat is largely humus ; and moist humus, or the water in which humus is dissolved, is a powerful dissolvent of mineral matters. Hence peat would rapidly assimilate bones, coprolites, pieces of limestone &c. Peat used as litter in stables or for closets would act not only as an absorbent but as a deodorent. Peat after being used in closets and urinals has produced wonderful results in orchards and vineyards. It follows that if peat is to be cultivated *in situ*, the more of ammoniacal matter, with potash, lime and phosphates, that can be added, the better. That peat, especially such peat as we have in Ceylon, contains all the elements of plant life, as I have seen asserted in articles read by me for the purpose of this notice, I do not believe. What I do believe is that by the abstraction of moisture, by aeration and the addition of mineral matter in the shape of clay (or forest mould) lime, ashes, bones &c., the carboniferous substance can be converted into rich orchard soil or beautiful and profitable meadow land.

While I am writing, a letter and specimens of cinchona and tea leaves are sent up from "the lower division," to show the effects of the hail which I mentioned as accompanying the thunder, rain and cyclonic wind-storm of Friday last, when the coolies complained that the crystals of congealed moisture "burnt their feet." On the upper portion of the estate no appreciable damage seems to have been done, but here is the report from 1,000 feet further down in the valley of the Dimbuldanda, where the small tornado was more violent even than what we experienced :—

"I send some twigs of cinchona and tea to show you what damage the hailstones did. I was extremely disgusted to see the tea bushes looking so shuck in places this morning, and at first could not make out what it meant. Fortunately the storm must have passed over the place in wavy streaks as only occasional patches are much injured, otherwise the damage might have been very serious. As it is we may feel its effects for a little, though not to any great extent, I hope. I can now understand what a severe hailstorm means to our Indian friends. The young soft leaves on the tea *seem* to suffer less than the old hard ones. A few which I enclose look as if they had been at Waterloo."

The writer might well think of the effects of showers of shot in battle, for the cinchona and tea leaves which accompanied the letter are riddled and torn after a fearful fashion, as you will see from the specimens I enclose. The first block of this estate (Abbotsford) was purchased just a score of years ago this month ; and during the whole of its history since, we have had no such visitation as is now recorded. We have heard stories of big hailstones elsewhere which we considered apocryphal in some of their sensational details; especially a tale from Haputale of lumps which remained unmelted for a couple of days in the coolies' lines ; but we now believe in the potent reality of hail, the product of the "long-looked-for-come-at last" electricity ? or of the sudden fall of cold air from the higher air into the lower, owing to sudden and limited local atmospheric depression ? Curiously enough Blanford, in his work on the climates of India and Ceylon, says nothing about the formation of hail, which is frequent and destructive to tea plantations in the valley of the Brahmaputra and elsewhere in Assam, while in Northern India the hailstones are sometimes of such a size as to kill large numbers of cattle and even prove fatal to human beings who have been exposed to their violence. Hartwig, in his "Aerial World" states that in temperate climates hail storms are frequent on the plains, while in tropical countries hail rarely occurs under 1,800 feet altitude ? Hail in the mountain region of Ceylon seems more prevalent on the eastern or north east-monsoon-side, than on the western ; the phenomenon being not uncommon in Uva, where it has sometimes occurred on a scale which involved considerable damage to crops. Hartwig in his "Aerial World" states :—

"Hail is beyond all doubt one of the most enigmatical atmospherical phenomena, as it is one of the most destructive. No meteorologist has been able yet to explain in a perfectly satisfactory manner how hailstones of such considerable size are able to form in the clouds in so short a time, and often in the most sultry weather. On Volta's Theory the hailstones are successively attracted by two clouds charged with opposite electricities, and thus grow until they fall; but if the hailstones were thus attracted, it seems much more probable that the two clouds would be mutually attracted and would unite.

"The sudden irruption of cold air streams into a hot atmosphere charged with aqueous vapour, or the rarefaction and consequent refrigeration of the air produced by the rotary winds, have likewise, been called in to explain the mysteries of hail; but the most sagacious theories have hitherto found more

opponents than adherents; and not one of them is free from serious objections. Evidently there are influences at work in the clouds which we are not yet able to measure, and the causes of many of the revolutions of which they are the scene are still as unknown to us as they were to the philosophers of ancient times."

One thing seems certain, however,—that the phenomena of thunder and hail are closely connected and that the conditions which favour discharges of electricity favour also the formation of hailstones. This view is supported by the following extract from the valuable compilation already quoted:—

"The chief characters which distinguish hailstorms from ordinary thunderstorms are the peculiar rattling noise which precedes the fall of the hailstones, the whitish colour of the cloud-stripe in which the latter are formed, and a darkness which Tessier compares to that which is occasioned by a total eclipse of the sun. According to Professor Muncke's observations, single flashes of lightning and abrupt thunder claps are not so common at the beginning of a hailstorm as a continual discharge of electrical light and an uninterrupted rolling of thunder. After a thunder cloud has rained for some time, the danger of a destructive hailfall is generally past. In most cases hailstorms begin with the phenomena above described; a thunder-clap of surpassing violence ensues, then follow single heavy drops of rain, succeeded by single small hailstones, and by the pelting hard shower which, with short periods of intermittence, and accompanied with thunder and lightning, generally lasts but a few minutes."

The above description very closely applies to our short, sharp cyclonic thunder-hail-and-rain-storm of Friday, which lasted less than half-an-hour, depositing in that period over an inch of rain, mixed with the hailstones which burnt the coolies' feet and riddled the leaves of a few of our cinchona and tea plants. As an atmosperical phenomenon, such a compound storm is interesting, once in a way; but one occasion in a score of years, for the recurrence of similar conditions, will suffice to excite feelings less pleasant than those of scientific curiosity. The fall of hail from the atmosphere, so destructive of vegetable, animal, and even human life and property in some parts of the world, seems as great a mystery as the vesting of certain snakes with venom and certain fishes with benumbing electrical powers.

NANUOYA, Dec. 3rd.

Considering that our *albizzias* are a year younger than the Nawalapitiya trees and grown at an altitude about 3,000 feet higher, they do not compare badly. The details of some are:—

Height 85 ft.	Cir. of stem	5' 10"	Single stem
„ 75 „	do.	5' 5"	Do.
„ 75 „	do.	6' 7"	Branches into 3 at 6 ft. from ground.
„ 78 „	do.	5' 8"	Do.

The growth of these trees in both localities is surely phenomenal.

The forests around us, sloping up to Nuwara Eliya are putting on more and more brilliant colouring every day. We part, this morning, from them and "the Hills" with regret.

CINNAMON CHIPS.—The recent of today's meeting with its miserably poor attendance of five persons, shows to our mind that not only was no abiding interest felt by the majority in the movement to put a check on the export of "Chips," but that the agreement honorably entered into, cannot virtually have been kept as promised. The meeting very wisely therefore considered it expedient that the agreement should be cancelled. The only gentlemen present besides Mr. Jardine, Chairman, were Messrs. J. W. de Soysa, Fonseka, (father and son), M. Cockburn; and Mr. de Mell looked in after the meeting was over.

CATTLE TREATMENT IN MADRAS.

The Madras Agricultural Department has hitherto had a branch specially devoted to the investigation and treatment of cattle disease. This, we regret to see, is now to be abolished. It is the old story of efforts made on the ryot's behalf and rendered futile by the ryot's insuperable apathy. In the presence of the stock inspectors, as Mr. Hazelton, the Inspector of Cattle Diseases in the Presidency, tells us, their advice was frequently adopted, but directly they left the neighbourhood, it was found that no further trouble was taken. "Nearly all the stock inspectors complain of the little assistance they receive from the village officials; and as the stock inspectors can hardly hope to become personally acquainted with the majority of the ryots of the district, this want of interest on the part of village officers, in a subject which so nearly concerns them, has a very marked effect on their work." The Local Government has accordingly come to the conclusion that any attempt to directly combat cattle disease is, in the existing state of feeling among the farming classes, practically useless. To those who recognise how much the welfare and prosperity of the mass of the population depend on the improvement of agriculture, and how important to this end is a good and healthy breed of cattle, this example of stupid indifference set by the Madras ryots is distinctly depressing.—*Pioneer.*

KELANI VALLEY: HEAVY YIELD OF TEA IN THE VALLEY.—Ruwauwella Division, Dec. 1st.—I never saw the tea in the K.V. looking better. I fancy if "Burra Fajur" could see it now he would retract his opinion of four years ago—that the places would never keep up their yield. I know of more than one place that with still a month of its year to run has given over 600 lb. per acre. One place the day I was there got an average of 23½ lb. a cooly from eighty pluckers off an 8-day flush. Mr. Hardie has resumed charge o- Indurane, and Mr. Kingsford has returned to Madulf tenne. I hear there is to be another change in the district shortly.—Local "Times."

NUWARA ELIYA CARP.—We call special attention to Mr. LeMesurier's letter in another column which shows the good service done to the island by the fish culture experiments with which the Nuwara Eliya Assistant Agent has so closely identified himself. Not only private individuals, but Government must bestir themselves to take full advantage of the ample supply of fry now available for stocking ponds and tanks. An item in the Supply Bill report is "R2,000 for the purchase of freshwater fish for stocking the rivers, lakes and tanks in the interior"; but is due advantage being taken by Government of the carp fry available at Nuwara Eliya and could any better fish be got for local purposes in tanks, &c.?

QUININE.—The London market has been very quiet this week, and almost the only sale reported is of a parcel of 5,000 oz. German from the makers at 12½d per oz. January delivery. On the spot we make 12d per oz. the nearest quotation. The imports of quinine into the United States during the ten months of the year were 2,850,000 oz., against 2,168,000 at the corresponding date of last year. It is reported that the departure to Europe from New York, during the last days of October, of a representative of one of the American quinine-works has given rise to a good many rumours as to the cause of his visit. In some quarters it is believed that his mission is connected with a plan to revive the effort to organise a combination of the producing interests of Europe and the United States. The Java Cinchona Planting Company, "Kertamanah," in Amsterdam, has paid a preliminary dividend of 6 per cent for the year 1890.—*Chemist and Druggist,* Nov. 15th.

COFFEE LEAF DISEASE.

At a meeting of the Wynaad Planters' Association on 5th November last, among other business (Mr. J. F. Jowitt being in the chair) it was noted:—*Leaf Disease.*—The Honorary Secretary read a letter from his London agents saying that experiments with the hand power Strawsonizer were not as yet sufficiently complete to enable the makers to put it on the market.

The Honorary Secretary stated that a member of the Association had recently returned from Naples where he had had an interview with Col. Giuseppe Novi, who has recently experimented on the Phylloxera, and was anxious to experiment on the Hemileia Vastatrix, that he had brought back with him a ton of a mixture for the treatment of the Hemileia which he had placed at the disposal of the Honorary Secretary. Another member of the Association writing from Rotterdam promises the translation of a pamphlet lately published there on the propagation of the Hemileia fungus.

THE AMSTERDAM CINCHONA AUCTIONS.

AMSTERDAM, November 6th.

At the cinchona sales held here today a large quantity of Java cinchona bark, containing the enormous equivalent of 741,000 oz. quinine, was offered for sale. The greater part of the holders showed themselves willing to make concessions, and 4,281 packages sold at a decided decline, the average unit being only 8 cents per half kilo., or about midway between 1⅝d and 1½d per lb., less by about 8 per cent. than the price of Tuesday's London auctions. The following is the range of prices paid:—Manufacturing barks, quill, broken quill, and chips, 10 to 70 cents (=1¾d to 12½d per lb.); ditto root, 18 to 58 cents (=3¼d to 10½d per lb.); druggists' barks in quill, broken quill, and chips, 8 to 78 cents (=1½d to 1s 2d per lb.); and druggists' root bark, 12 to 22 cents (=2d to 4d per lb. The principal buyers, in order of their purchases, were Messrs. C. L. Schepp & Zoon, Rotterdam; Messrs. Matthes & Bormeester, Amsterdam; the Brunswick Quinine Works; and the Amsterdam Quinine Works. —*Chemist and Druggist.*

ARTESIAN WELLS AT QUETTA AND MADRAS.

Artesian wells are being bored successfully in various parts of Quetta, and one in Sir R. Sandeman's compound is worked by a windmill (an American patent) much to the astonishment of the natives.

A bore at Negapatam has been sunk to a depth of only 200 feet which in the country of Artois itself would have been considered extremely moderate and far below the average. With a bore of this depth the water rose to within one foot of the ground surface, thus practically demonstrating that an artesian spring had been struck. In the Madras Presidency at least wells have not been bored to any great depth and great advantages might accrue if the Negapatam Councillors persevered in their efforts to sink the bore deeper, even though it may not be clear to them that better results would be achieved. The Government order on Dr. King's Report promises help from Provincial funds as an inducement to the Councillors to continue work. As it now stands the well is a success in as far as the two essential requisites of a water-supply, namely, quantity and quality, have been secured.—*Indian Engineer.*

[It is rumoured that the mission of the Director of Public Works, Mr. MacBride, who is leaving for India shortly, is to inspect work done in Artesian wells with reference to the requirements of the Jaffna Peninsula and other parts of the island.—ED. *T. A.*]

PIGEONS AND BEES.—Says a writer in the latest *Cornhill*:—An American passenger pigeon passes the Atlantic Ocean in two days and two nights, flying at the rate of 1 600 miles a day. A curious account is given of a race between bees and pigeons, in which the first bee finished a quarter of a minute before the first pigeon, three other bees beat the second pigeon, and eight bees and eight pigeons made a dead heat over a course of a league.

THE NEW COCONUT PRODUCT.

Paragraphs have been going the round concerning a new manufactured product of the coconut, which is spoken of wrongly as "coconut butter." Being regarded as a butter, and produced at about half the average market price of ordinary butter, some writers have fallen into the error of regarding it as a new adulterant of dairy produce, and a rival to margarine. In the first place it is not a butter in any sense of the word, and in the next it is not at all likely to be employed as an adulterant by reason of its peculiar flavour and colour. It is, in fact, a vegetable lard, and as such is intended to be used in cooking, and perhaps in pharmacy. The natives of India use a large quanity of fat under the name of "ghee," answering in colour and quality to our "lard." It is the product of buffalo milk, and inasmuch as Hindoos will not use any animal fat, and the Mahommedans avoid the use of hog's lard, this ghee is the only article in use throughout India for culinary purposes, and it is rather dear, for there is a large demand for it, and the supply is limited. The newly-introduced coconut fat is said to be both a better and cheaper article which cannot fail to commend itself to the Hindoos and Mahommedans, and so come into extensive use throughout India as a purely vegetable product.—*Burgoyne's Monthly Prices Current.*

THE NEW DIMBULA COMPANY, LIMITED.

REPORT, SEASON, 1889 90.

The Directors have pleasure in presenting their Fifth Annual Report.

The yield of coffee, cinchona, and tea, has in each case exceeded the estimate, and good prices have been realized. The quality of the tea is well maintained. The reports received by the Directors of the present condition and unfavourable future prospects of the coffee cultivation have induced them reluctantly to consent, as a precautionary measure to have a portion of the remaining coffee land interplanted with tea. Cinchona has been suffering from repeated attacks of caterpillers, which have caused some mortality among the trees. Tea is progressing satisfactorily, and the Directors anticipate a substantial increase in productiveness during the present season. The accounts now presented show a surplus of £4,661 after crediting "Tea extension fund" as usual, with a proportion of the cinchona proceeds, and after writing off a due proportion of the "Factory and Machinery Account." The Directors propose a Dividend at the usual rate of 8 per cent per annum, on the A Shares for the year ending 30th June last, one-half of which was paid in March last. In accordance with the hope held out at the last General Meeting, the Directors were able to pay 2 per cent on the B Shares in March last, and they now propose a further payment in reduction of the cumulative dividend accruing on these shares of 4 per cent. The Directors have much pleasure in recording their appreciation of the energetic and efficient manner in which the Manager and Superintendents continue to conduct the affairs of the Company in Ceylon. Mr. Carver having retired from the Board, the Directors have elected Mr. William Herbert Anderson, late of Holyrood estate, to fill the vacancy.—By order of the Board, J. SWAN, Secretary.

52, Gracechurch Street, London, E. C., Oct. 27th.

THE NEW DIMBULA COMPANY, LIMITED.

Working Account, 1889-90, for the Season ending 30th June, 1890.

Dr.

	£	s.	d.	£	s.	d.
To Ordinary Expenditure in Ceylon—						
Coffee	3,124	7	7			
Tea	6,555	18	11			
Cinchona	857	1	4			
				10 537	7	10
Two two-thirds of proceeds of Cinchona transferred to "Tea Extension Fund" ...				2,016	0	0
To amount written off "Factory Account"...				1,560	0	0

	£	s.	d.	£	s.	d.
To Expenditure in London—						
Directors' Fees, Secretary and General Office Expenses				484	2	10
To Balance of Interest				59	2	7
To Balance carried to "Profit and Loss Account"				7,289	9	8
				21,946	2	11

Cr.	£	s.	d.	£	s.	d.
By net proceeds of produce sold in London—						
Coffee	7,067	12	7			
Tea	10,673	3	10			
Cinchona	3,024	18	6	20,765	14	11
By net proceeds of produce sold in Ceylon—						
Coffee	76	15	5			
Tea	112	1	9			
				188	17	2
By Commission on Sale of Produce, &c. ...				599	7	5
By Balance of Interest						
By Manufacturing other Tea				392	3	5
				21,946	2	11

TEA EXTENSION FUND.

Dr.				£	s.	d
To expenditure in Ceylon, in continuing the replanting and improvement of the Estate, and cultivation of land not in bearing :—						
Tea	£1,536	0	7			
Cinchona	80	18	9	1,616	19	4
To Balance carried to next account, as per Balance Sheet				1,199	12	5
				2,816	11	9

BALANCE SHEET, JUNE 30TH, 1890.

Dr.	£	s.	d.	£	s	d.	£	s,	d.
To Capital Subscribed—									
2,208 A shares				22,080	0	0			
Bonus Capital—									
5,571 B shares	55,710	0	0						
841 C ,,	8,410	0	0	64,120	0	0			
				86,200	0	0	86,200	0	0
To Capital Unissued—									
1,792 A shares	17,920	0	0						
429 B ,,	4,290	0	0						
2,159 C ,,	21,590	0	0	43,800	0	0			
in all 13,000 shares. Total Capital				£130,000	0	0			
To Sundry Creditors—									
Acceptances outstanding ...				£7,115	8	3			
Accounts outstanding ...				259	7	0	7,374	15	3
,, "Profit and Loss Account"							4,661	5	3
,, "Tea Extension Fund," Balance from above Account							1,199	12	5
							£99,435	12	11

Cr.	£	s.	d.	£	s.	d
By Prime Cost of estate ...	20,938	4	0			
,, Amount of Bonus Capital as per Contra	64,120	0	0			
Total Nominal Cost of estate				85,058	4	0
,, Factory and Machinery" as per last Balance Sheet	4,796	0	0			
,, Additions during the year	760	0	0			
	5,556	0	0			
Less Amount written off	1,560	0	0	3,996	0	0
By Cash at Bankers—						
Deposit and Current Accounts				6,759	10	8
,, Office Furniture				30	0	0
,, Produce in hand and in transit, 30th June, since realized at				3,574	0	2
,, Sundry Debtors				17	18	1
				£99,435	12	11

FRUIT CULTURE.—There is an interesting paper in the *National Review* on "Fruit Culture in Worcestershire," by Mr. Parkinson, who mentions, among other interesting facts, that one earwig biting a hole into one apple may cause a whole roomful of stored fruit to go rotten.

CEYLON TEA IN EGYPT.

The *Egyptian Gazette* of 19th Nov. contains the following paragraph :—

We draw the attention of our readers to the advertisement of the Ceylon Tea Growers' Association for which Messrs. Edgar Kirby and Co. are the agents in Egypt, with Mr. Fleurent as sub-agent at Cairo and Mr. J. Slavick as sub-agent at Port Said. Ceylon tea has made its way of late years in public favour ; the Egyptian market has not been overlooked and the honour of being the pioneers of the Ceylon tea trade in Egypt belongs to Messrs. Edgar Kirby and Co.

The advertisement referred to is as follows :—

THE CEYLON TEA GROWERS' ASSOCIATION, COLOMBO.

Sold in leaden packets of ½ lb. and 1 lb. Each packet bears a facsimile of the "Chief Brand" without which none is genuine.

Sub-Agents.

Cairo.—E. J. Fleurent, opposite the Credit Lyonnais.
Port Said.—Jas. Slavick.

Sole Agents for Egypt,

Edgar Kirby & Co., Maison Bolanachi, Alexandria.
N.B.—Seven one-pound packets of our best Ceylon Tea sent postage free to any part of Egypt.

Just below this advertisement appears another, as follows :—

CEYLON COOPERATIVE TEA GARDENS CO.
Thés de Ceylan Sans Mélange.
En paquets de 1 *lb.* enveloppés de plomb sur les terrains de récoltece à Ceylan, ou en boîtes de 10 *lb.*
Seuls agents à Alexandrie : Mellor & Co.
Do. au Caire : Walker & Co.

The more the merrier !

CINCHONA CULTIVATION IN JAVA.

Mr. van Romunde's report for the 3rd quarter of 1890 on the Java Government Cinchona Gardens states that the weather had been changeable, the east monsoon having been, as in 1889, very abnormal. The continuous rain on the Tangkoeban-prahoe had interfered with the growth of the plants. Stirring of the soil had been carried on vigorously during the quarter. A commencement was made with the planting of strips of land to form belts between the four establishments on the Malabar mountains. The caterpillar plague again gave great trouble, except in the closely planted gardens, and these were therefore cropped as little as possible. The crop of bark for the year was so far 250,000 half kilograms, of which at the end of September 177,369 pounds had been despatched to Tandjong Priok. At the sales in July and August in Amsterdam of bark of the 1889 crop, the average prices per half kilo and per unit of quinine sulphate were 8 and 9½ cents. On account of the want of dry weather in 1889, and excess of rain this year, the ledgeriana blossoming and fruiting was interfered with, and consequently the numerous orders for seed could not be executed. Sales of seed could not therefore take place before November and December.

ORANGE-GROWING is now a considerable and increasing industry in some parts of California. And by last report of the British Vice-Consul at Los Angelos an orange orchard of ten acres there, in eight years from planting, will pay for all the outlay and leave the owner a profit of £490 or thereabouts. After that it will yield a return to the owner of not less than £1,000 per annum. Good suitable land with water-right can, he says, be bought at £60 to £70 an acre. The crop at Los Angelos, which last year reached 27,000 tons, will this year reach 35,000 tons.—*A. F. Press.*

PURE CEYLON TEAS *VS.* IMPURE TEA BINS AND "CLEANSING FIRES."

That the second is incompatible with the first goes without saying. Then how to keep the second *constantly pure* and without much trouble is the question. Mr. John Hughes, the Chemist, has already told us how to purify metal tea-pots—clean them well out with hot water and while the moisture still clings to their interior drop in a live coal and close the lid—the resultant steam will, in five minutes, thoroughly cleanse *metal* tea-pot. Carry the same idea out with regard to tea bins. Speedily sponge down the sides, then rapidly place on two bricks at the bottom a piece of iron, the size of half a brick, brought to white heat in the Sirocco, close down the lid and make airtight, and the virtue of "cleansing fires" is at once secured.—*Cor.*

THUNDERSTORMS.

ROBERT H. SCOTT, IN "LONGMAN'S MAGAZINE."

A flash of lightning a mile in length is nothing very extraordinary, and it is therefore not to be wondered at that experiments to bring electricity down from the clouds are very dangerous, and have frequently had fatal results. Soon after Franklin, in the last century, had made his famous experiment with a kite, and proved that electricity existed in a thunder-cloud, natural philosophers generally began to imitate him. One of them in St. Petersburg, a Professor Richmann, arranged in apparatus to collect this electricity. On the first occasion of a storm he went to his laboratory to observe the effects. A ball of fire was seen to leap from the apparatus to his head, and he fell lifeless. Having thus got some idea of the force exerted by lightning, it may be interesting to the reader to learn something as to the means we possess of guarding ourselves, or rather our houses, from injury. A flash of lightning really consists of a discharge between two objects, say two clouds, or a cloud and the earth, oppositely electrified, the charges on which suddenly combine, with the manifestation of light and heat. Lightning conductors are contrivances by which the electricity of the earth is allowed to escape quietly into the atmosphere, where it meets with electricity of the opposite character from the clouds, and the two neutralise each other quietly, without any explosive discharge, or, in other words, without lightning. I need not go back to the first principles of electrical science and explain why it is that electricity passes most easily through metals, and escapes with greater freedom from sharp points than from rounded knobs. Assuming these elementary facts, I may say that on any object, such as a house or other building, the electricity tends to accumulate itself on all projecting portions of the roof, &c., and especially on the highest points of it.

The ideal complete lightning-rod system would call for a sharp-pointed copper rod erected at each of these projecting pinnacles, and rising above it, and would then connect all of these separate points by copper rods, and eventually carry down a stout copper rod to the earth. Care must be taken that due attention is paid to certain main precautions:—(1) The point of the conductor must be kept sharp; (2) the section of the conducting-rod must be sufficient to allow the electricity to pass along it; (3) the rod must be perfectly continuous; and lastly (4), the rod must be efficiently connected with the ground. 1. The sharpness of the point is insured by gilding it or coating it with some metal which resists oxidation. 2. As to the section of the rod, a bar half an inch in diameter is sufficient for all ordinary buildings. Bars are not usually employed, as it is difficult to bend them over cornices, &c.; accordingly, either wire ropes or tapes are taken. The wire ropes are more liable to corrosion from wet getting in between the strands than are tapes, so that the latter are generally preferred. The metal used is always copper, being less oxidisable than iron, and being reasonably cheap and a very good conductor. 3. The continuity of the metallic connection from the highest point of the rod to the ground can only be secured by having as few joints as may be, and by making those joints as true and firm as possible by soldering. The joints should be examined from time to time, for it is often found, on examination of old conductors, that while the copper wire or tape is quite sound along its straight reaches, at the bends or joints corrosion has set in. As a chain is no stronger than its weakest link, a corroded conductor, such as has been described, is perfectly useless. 4. The earth connection.—It is not easy in all cases to insure that this is satisfactory. Electricity will not pass at all so easily into dry earth as into wet earth, and merely plunging the end of the rope or tape into wet earth is not sufficient. The conductor from the building should be soldered at its end to a large sheet of copper, say at least two square yards in area, buried in damp soil, or else soldered to the water or gas mains, so as to insure that a large surface of metal is in contact with damp earth.

Supposing that the whole system of protection against damage from lightning has been properly planned, the work should be carefully tested after its completion, because injury to it often occurs at the very last, owing to accidental causes, or to the carelessness of workmen. Conductors should also be examined from time to time, throughout their whole length, to make sure that all the joints are sound. Care should also be taken that the earth in which the terminating plate is buried is kept thoroughly moist. If any of these particulars be neglected, the conductor will be practically useless, and will afford no protection to the structure. The extreme practical importance of security against lightning must be my excuse for having been more diffuse over the object of lightning-conductors than over other details of the phenomena and effects of thunderstorms.—*Public Opinion.*

INDIAN TEA IN PARIS.

All who are interested in the progress of the tea industry in India will be pleased to hear of efforts being made to open new markets for the yearly increasing production of the country. The Indian tea planters too long neglected this work, but during the last few years they have been striving to make up lost ground. By far the most interesting and important of these undertakings is that which is being conducted in Paris. Paris is important as being not only the capital of France, but the centre of the world of fashion, although, in the interests of British tea-growers, we must regret that up to the present fashion has not set in favour of tea.

Under the auspices of this movement one of the first tea cafés in Paris has been opened at 12, Rue Auber, centrally situated near the Opera House, and it is certain that it will be a boon to those who love good tea, well made and served. In order to associate this new departure with the Indian Palace, the designs have been prepared by the same architect, Mr. Purdon Clarke, C.I.E., F.R.I.B.A., who is probably better qualified than any other man in Europe to show what can be done in the adaptation of Indian architecture to European requirements. The façade, an arcade of three entrances, is in the Mogul

style. It consists of a carved framework in Deodar filled with panels of highly decorated Indian glazed tiles. Above are two inscriptions in Hindustanee and the words "Au Palais Indien." The front of the interior is divided into two parts by an ornamental carved screen filled with lattice work. At the back is a spacious saloon. There is a separate entrance to each of the front divisions, one of which is used as a shop for selling dry tea, and the other as the tea restaurant. It is hoped that this will compare favourably with even the most handsome cafes in Paris. The Indian style is carried throughout. Opposite the partition mentioned above, there is an elaborately carved divan in a recess also filled with lattice work and carving. Between the front salon and the larger room behind are three beautiful Indian arches, both sides of which are covered with carving. The larger saloon represents the tent of an Indian prince; the walls and ceilings are draped with rich stuffs, and the light is softened by being admitted through three windows of stained glass. These windows recall those formerly existing in the old palace of Jeypur. In panels the names of the leading tea districts—Assam, Cachar, Sylhet, Dooars, Kangra, and Kumaon appear in striking colours. It will be felt that all this is a brilliant and appropriate setting for the Indian tea of excellent quality which is the only kind supplied. So far as we know this is the first shop or restaurant in Europe the decorations of which are exclusively Indian. As an example of how easily the rich art of country can be applied to European requirements we hope the restaurent may be popular with many who are not so deeply interested in the tea question.—*Times of India*, Nov. 5th.

WYNAAD PLANTING NOTES.

Like Mr. Micawber, we are beginning to hope that "something is going to turn up," for the weather has been so extraordinary and so unusual, that we can only suppose (according to your "Native Observer") that the Shastras must have predicted it. Perhaps he can also tell us what results are to be expected! Continual downpours have kept the country as green and luxuriant as in mid-monsoon; plants, which are usually withering by now, have again sprouted up in fresh life. There is a rush of new wood on the coffee trees, and spike is showing up. We heard unmoved, of cinchona clearings being planted up during the last week in October; and those who were shaving (trees) experienced phases of despair, only to be understood by the spectacle of heaps of bark becoming "discolored," for lack of sunshine to dry it properly. But during the last few days there has been a delightful change, and we are having bright days and cool crisp mornings and evenings, without the usual accompaniment of east winds. It is great relief to us; for we began to dread a renewal of the leaf disease from continuous wet. Our coffee is, as usual, looking "splendid for next year." It should console us for the wretched disappointment of the present crop, to notice that an idle season has apparently invigorated the trees very markedly. Fields which a few months ago seemed fit, only to abandon, have burst out again in a splendid show of new wood and leaf. If only we could feel sure of seasonable blossoming showers, we might be eased of a great load of anxiety, for the trees give every promise of a fine crop in '91. Over that of '90 we may draw a melancholy veil. With most of us, even our lowest estimates have been reduced, and "reduction" in everything else, is the alarming result—*alarming*, because coffee now-a-days must be coddled—or go out,—so that it is after all but a doubtful economy to cut down, absolutely, necessary expenses. The lowness generally affects our labour. Crop is nearly over in most places already, and it is very difficult to employ the usual gangs. The labour question has been an unpleasant one all this year. Our coolies (heavily advanced of course) should have been in during the latter end of May, but very few arrived before August, and many are only now putting in an appearance. Consequently we had to struggle through our weeding and planting, with any gangs we could get from the coast, and our Lordly Canarese complain, because, "they've got no work to do," and threaten to take contracts in other districts, oblivious, seemingly, of what they still owe us. * * * The ambona disease still continues in places, but has not destroyed all faith in the product. New clearings have been opened in the district for ledgers, and a great deal of Liberian coffee, and pepper has also been planted. The pepper crop does not seem to be particularly good this year. Let us hope that it, as well as coffee, meditates doing us a good turn in the coming season. I think we deserve it.—*Madras Times*, Nov. 22nd.

NOTES ON ESSENTIAL OILS.

(*From Messrs. Schimmel & Co.'s Report.*)

EUCALYPTUS OIL.—The production of eucalyptus oil in Algeria, which only amounts to about 2,000 kilos a year, is said to be capable of considerable extension, and even at the low prices it must be a very lucrative industry, if one may judge from the experiments which have been made in Leipzig with French material, the price of which was greatly enhanced by the enormous rate of railway carriage. It is also said that in Algeria the cultivation of *Eucalyptus rostrata* is steadily gaining ground, although this species is of slight value only for the manufacture of oil. Oil of this variety has not hitherto been known in commerce. With reference to an observation by Mr. P. W. Squire, in the *Chemist and Druggist* that an oil has frequently been met with in commerce lately which was offered as *Eucalyptus Amygdalina*, but which contained no phellandrene, and was dextrogyre instead of levogyre to polarised light, we have ourselves noticed that the oil bought direct from Australia recently contained only a small percentage of phellandren and was weakly dextrogyre. We are of opinion that the leaves of different varieties of eucalyptus are no longer kept carefully separated in Australia during the distilling operation, and that consequently the names under which the oils are brought into commerce do not always correspond with their origin. On the occasion of the recent Berlin Congress three new varieties of eucalyptus oils distilled by us were exhibited. These oils are not yet found in commerce, but one or the other of them is about to make its appearance. These oils are the distillates of *E. dealbata*, *E. maculata*, and *E. maculata* var. *citriodora*, all of them of a fine melissa-like flavour. In the meantime large samples of distilled oil of *E. maculata* var. *citriodora* have been received from Queensland. This oil has been distilled by Mr. Jeffreys Timbury. Not only does its flavour agree with that of our distillate, but its other properties also are so much akin to it that there is no doubt of the identity of its origin. Its s.g. at 15° is 0 873; about three-fourths of it has a boiling point of 205° to 210°, small quantities vapourising somewhat below or above this temperature. The fraction having a boiling point of 205° to 210° consists of almost chemically pure citronellon. Upon agitating the oil with a solution of bisulphite of soda the mixture becomes strongly heated and forms a fairly hard mass, from which, after washing with ether and decomposing with a solution of soda, pure citronellon separates. The parts of a lower boiling-point than 200° (about 4 per cent. of the whole) showed none of the characteristic reactions of cineol (eucalyptol), and it may therefore be taken for granted that this body is wanting in the oil of *E. maculata* var. *citriodora*. The thoroughly rectified oil is colourless, has a pleasant flavour of melissa, and, presuming the price not to be too high, will be useful in perfumery and soap-making. Unfortunately, we are quite in the dark as to the price, and therefore will scarcely be possible to make any sales until April next year. There is no doubt that the oil has a very much finer flavour than citronella oil, and if its price should lie between 2s 6d and 3s 6d per lb. it may find a considerable employment; if it is dearer however, it will only be used on a smaller scale. [In January of this year we had a communication from our Melbourne office regarding this oil, in which it

is stated that "the leaves are carefully separated from the young shoots, and the oil distilled from them alone. In its own district it is being used as a substitute for globulus oil for medicinal purposes. Oil distilled from the older leaves not separated from the stalks Mr. Timbury calls 'commercial oil' of *E. citriodora*, and sells it at 3*l* per gallon. The purer oil is put up for retail sale in bottles, sold wholesale as follows:—½ oz. 9s; 1 oz. 15s; 2oz. 28s 4oz. 48s per dozen, pint bottles, 20s each. Mr. Timbury states that the oil is a powerful disinfectant and deodorant, even the aqueous solution deodorising the most offensive matter. The yield from a ton of moderately dry leaves is about 520 oz. of oil, from fresh leaves about 270 oz. There is only one other lemon-scented eucalyptus." It would appear from this that there is little hope of the oil coming down to 2s 6d or 3s 6d per lb. We may also recall the fact here, which we stated as long ago as May, 1886, that the leaves of old and young trees alike of *E. amygdalina* and several varieties thereof, as well as the leaves of other species, are gathered by the bushmen collectors, who have no botanical knowledge; hence there arises considerable variation in the physical properties of the different brands of Australian *E. amygdalina* oil. —ED. *C. and D.*]—*Chemist and Druggist.*

A VEGETABLE CONDUCTOR OF ELECTRICITY.

Some very interesting letters and notes have recently been appearing in *Reis and Rayyet*, a very smartly-conducted Calcutta paper, in reference to an old and curious custom of the Hindus of Bengal. It seems that from time immemorial it has been the custom of the Hindoos to place on the roofs of their houses a plant, the identity of which appears to be disputed among Indian botanists, some calling it a Cactus, whilst others declare it to be a Euphorbia. One of the correspondents is quite mistaken when he says that the Cactus—which we will assume the plant to be—helps to draw the electric fluid into the house by the attraction of the electricity in the cloud above, whether there be a Cactus plant or not. The Cactus only serves to scatter the electricity of the house into space, and thereby to neutralise that of the clouds, for these two electricities are of two kinds. The Bengalee name of the plant grown on the roof is *báj-báran, i.e.,* a preventative of lightning—a fact which conclusively proves that the Hindoos are acquainted with the useful property of this sort of plant. It is not at all improbable that the ancient Hindoos, who displayed so much learning in other matters, should have been acquainted with the principles of electricity; the explanation is now lost, but the custom remains. An absurd, an idiotic reason is given in Hunter's *Dictionary*, in which it is seriously stated that because the Cactus protects their grounds from stray cows and goats, it will also similarly protect their houses from lightning: the idea is preposterous.

The custom of placing a Cactus on the roof is based on a highly scientific principle, viz., that of the "power of points." Electricity escapes far more easily through a pointed conductor than through a round one. For this reason the end of the brass conductors in an electric machine are mounted with brass knobs. The principle of saving a house from lightning with a metallic-pointed conductor and with a prickly Cactus is the same. When a cloud highly charged with electricty passes over a house, the house becomes charged with electricty of an opposite kind through induction, and these two electricities attract each other. Lightning is only the result of this mutual attraction, when a portion of the electricty of the cloud attracted by that of the earth below strikes the house. But if the house is provided with something having points, the electricty of the earth escapes into the air through these points, and neutralises the electricty of the cloud and thus the discharge cannot take place. The plant which the Bengalee and other Hindoos grow on the roofs of their houses has hundreds of sharp-pointed prickles. The more the number of points a conductor charged with electricity has, the more easily the electrical fluid escapes from it. Therefore, in this respect, the plant in question is far better than an ordinary conductor which has only one point. Now-a-days, the conductor of a house is provided with four or five points. The great drawback in the use of the Cactus is that it cannot have proper connection with the earth; the connection is chiefly through bad conductors. Still, something is better than nothing.

The subject is one of considerable general interest, and deserves careful investigation and enquiry. The custom does not appear to be observed in Upper India, but in Bengal it is a very common thing to see this plant in a tub placed on the house-top. This plant is not only held sacred, but is reputed to possess important medicinal properties.

The editor of *Reis and Royyet* states that the plant used on the housetops is not the Indian Cactus so suggestive of the hooded serpent, and appropriately called Nagphani, in Bengal, and Nagkali, on the Coromandel coast. That plant, though common enough, is neither sacred, nor, so far as we know, used as a medicine against snakes in this province.

The plant prized as a protection from lightning is the Tekátá,sij. It is not a Cactus but a Euphorbia. The subject is certainly one in which more light is needed. —A TRAVELLING BOTANIST.—*Gardeners' Chronicle.*

ON THE USES OF CURRY LEAVES.

BY DR. P. S. MOOTOOSWAMY, F.L.S., TANJORE.

The curry leaf tree (*Murraya Kœnigii*, Spreng), belongs to the natural order Rutaceæ, and is remarkable for its fragrancy. It is a small tree with pinnate leaves, leaflets alternate, ovate, somewhat serrated, panicles corymbiform, terminal, calyx 5-cleft; petals, 5, spreading; berry 1-celled, 1-seeded; flowers small and white, appearing in the hot weather. The tree is well-known throughout the plains of Southern India, where it grows in the jungles on the lower and mountainous slopes. It is also cultivated in gardens on account of its leaves, which are very fragrant and much used by natives for seasoning their curries. Some gardeners make their living by the daily sale of the fresh leaves, and coravars, a class of wandering dealers, bring the dried leaves, with those of *Solanum pubescens*, from the jungles and take them for sale from place to place. The vernacular names of the tree allude to it as "curry leaf" because of its use as a condiment, and in Sanskrit it is called the "fragrant neem," and other one or other of these names it is known throughout India, Burma, and Ceylon.

The leaves are the only part of the tree, in this part of the country, employed in native medicine, and their properties are aromatic, stomachic, stimulant, astringent and tonic. They retain their medicinal properties even in their dried state. The leaves are indispensable in seasoning native curries, broths, and pepper water for their daily consumption. It enters as a principal ingredient in their curry-stuff or condiment taken with the rice. In the absence of fresh leaves, dried leaves are purchased and stocked for the cold season. A seasoning preparation, called *vadugam* in Tamil, is made and kept for daily use in almost every house, except those of Brahmins, who do not use onions in their diet. It consist of onions in large quantity, while the other ingredients form smaller proportions. These are galic, cumin, fœnugreek, mustard, turmeric, and curry leaves. These are well beaten down in a stone mortar and made into a mass, from this a number of large balls are rolled up and dried in the sun. They are smeared with castor oil every morning as they are exposed, and after a few days will become dry enough to store. Curry leaves are also used for flavouring chutneys.

Persons suffering from dyspepsia and diarrhœa resulting from indigestion, make a broth from the leaves. They are first broiled with ghee, and after the addition of a little tamarind and salt, water is added,

and the whole boiled. I have found this decoction check the complaint at once.

A useful preparation for allaying vomiting and purging in children is the following. Curry leaves, tamarind, neem, country gooseberry, morinda, of each one ounce, sweet flag and ajwain, of each one drachm, water ten ounces. The dose of this is half an ounce twice a day.

The green leaves rubbed up to a paste and mixed with buffalo's tyre (butter-milk) have been given with success in adult dysenteric cases. The dried leaves enter into a compound powder largely used as an astringent. The seven articles are as follows, with their botanical, English, and Tamil names.

Murraya Kœnigii	Curry leaves dried	Karuvepillai.
Mangifera Indica	Mango seeds	Manga palavirai.
Solanum pubescens	—	Soonday kavathu.
Trigonella Fœnum-græcum	Fœnugreek	Vendayam.
Phyllanthus Emblica	Country gooseberry	Nelli-kai.
Feronia elephantum	Wood apple	Velampalam.
Carum copticum	Omum	Omum.

Equal parts of these drugs are finely powdered separately and then mixed. The dose for children is 3 to 5 grains in honey, and for adults 15 to 30 grains in buffalo's tyre. This powder is much resorted to by native physicians in the treatment of dyspeptic diarrhœa of children attended with flatulency. It is very singular that native doctors, ignorant as they are of the therapeutic action of medicine, never combine opium or other narcotic preparation in their administration of remedies in diseases of children.

Dr. Roxburgh mentions that the bark and root of the plant under reference are applied externally to cure eruptions and the wounds made by the bites of animals. A decoction of the leaves is used in fever mixtures, mixed with other aromatics and bitters.

A clear transparent yellow oil is sometimes extracted from the seeds and is known as Simbolee oil.

A chemical examination of the leaves has been made by Mr. J. G. Prebble, and will be found in the *Pharmacographia Indica*, vol. i., p. 263-265. From the analysis it appears that the leaves yield to distillations a small quantity of volatile oil resembling that obtained from the leaves of *Œgle Marmelos.* Ether extracted $7\frac{1}{2}$ per cent. of resinous matter, and a further quantity was removed by alcohol. The resin was greenish black in colour, amorphous, and freely soluble in chloroform, bisulphide of carbon, benzol and amylic alcohol, less soluble in glacial acetic acid, and petroleum ether, and almost insolube in acetic ether. It gave an emerald green coloration with sulphuric acid, and yielded picric acid when oxidized by nitric acid. The aqueous solutions of the ethereal and alcoholic extracts contained an acid principle darkened by iron salts, but not precipitated by gelatine. The bitterness of the leaves is due to a glucoside provisionally named *Kœnigin*. The crystals were sparingly soluble in water and alcohol, and the solution was precipitated by tannin lead acetate, and fenoso-ferric salt, but not by alkaloidal reagents.—*Pharmaceutical Journal.*

BRITISH GROWN TEA.

To the Editor of the "Manchester Courier."

Sir,—It is said, and truly said, of a great living orator, that he made statistics eloquent. He so well understood and so dexterously employed the fine art of language that the humdrum figures of a Budget were bright and fresh and full of pleasant surprises. We wish we knew the secret of making attractive the figures which, with your kind permission, we would lay before your numerous readers. To bespeak their interest in our statistics we would state by way of introduction that these figures claim attention, because they affect the reader's pocket. They also touch another equally susceptible spot—the palate, and they also appeal to his patriotism. As the last remark may excite surprise, we at once explain. It is the object of these figures to show to what a large extent the British tea drinker has already deserted China, to confirm him in that course, to urge him to deal another blow at that collapsing trade; to show that by a continuance of this preference for Indian and Ceylon teas he will be immensely assisting his countrymen, who are tea planting and tea farming in those great dependencies. That's where the patriotism comes in. Support your colonial fellow-countrymen, who on the hillsides of Assam and the Chingalese valleys are bringing science and method to bear—as well as compromising their livers—in order to send you tea which, as many British housewives are fully aware, is not only superior in flavour to China tea, but keeps its flavour much better. The almond-eyed Ah Sin does not send you his best tea. He never did. He has always used at home far better tea than he sells us. Thanks to our Auglo-Indian planters, John Chinaman's best is now more than equalled by Indian tea at less money. The China tea grower is in a bad way. He finds himself implacably thrust aside. Stung by the thought of a ruined industry, he promises to mend his ways. Trust him not. He will fool you again if you give him the chance. Now for the figures:—In 1888, for the first time, this country received more tea from India and Ceylon than from China. Go back 35 years to 1854. The quantity of China tea used in Great Britain was nearly 62,000,000 pounds, and the quantity of China tea used in 1889 in Great Britain was just over 61,000,000 lb. In 1854 however, the 62,000,000 lb. represented our total consumption, as China was our sole source of supply. But in 1889 we used 185,000,000 lb., of which India supplied 96,000,000 lb., and Ceylon 28,000,000 lb. Or to put it in another form. Of this 185,000,000 lb. consumed in 1889, India supplied 52 per cent, Ceylon 15 per cent, and China only 33 per cent. The first six months of 1890, 1st January to 30th June, show a further decline of China tea, a further increase in consumption of British grown tea, the figures being—Indian 54 per cent, Ceylon 16 per cent, and China only 30 per cent. The exports from China this season to October 30th are more than 25 per cent less than in 1889. The quantity of tea used annually per head of population in Great Britain shows the following increase: 1849, 1·81; 1859, 2·67; 1869, 3·63; 1879, 4·68; 1889, 4·91. Note how small is the increase in total consumption during the 10 years 1879-89 when compared with the preceding decades. Indeed it is calculated that during the last seven years the average consumption per head of population has remained stationary. This fact is naturally regarded with rueful eyes by Chancellors of the Exchequer, but it admits of a simple and satisfactory explanation. There is no decline in the demand for tea. This would be abundantly demonstrated if the number of gallons or cups of tea could be ascertained as easily as the weight of tea. Indian and Ceylon being so much stronger than China tea a greater number of cups can be made from the same weight of tea. Indian tea more especially possesses that quality quaintly described by an old Irishwoman as "taking a powerful grip of the second wather." The secret then of the enormous and yearly increasing popularity of the Indian tea may be found in its economy, in its absolute purity, and its exquisite flavour. It is also free from those deleterious qualities which sometimes produce so unpleasant an effect after drinking China tea. People find that instead of using the same quantity for a brew that they would of China tea, half the quantity is sometimes more than sufficient. It has been calculated that the British public, while consuming a larger number of gallons of tea in 1888, saved in that year £1,000,000 through using Indian tea instead of the weaker and less carefully cultivated article. In China tea culture has become desultory, careless, unscientific. In India tea is better grown, better manufactured, and vigilance, method, science, are having their natural reward. It is true that having fairly distanced China as a competitor, some complaints have arisen that the Indian tea industry is not at the moment so promising

as it at one time appeared. The gardens are as prolific as ever, the labour supply is improved, the demand is increasing every year, but Ceylon tea is so treacherously good that some Himalayan planters have feared that the competition of that favoured island is going to some extent to rub the gilt off the gingerbread. But an analysis of the balance sheets issued by 24 of the more prominent concerns shows that they yielded an average of nearly 7 per cent on the invested capital, and 17 out of the 24 concerns have reserve funds saved out of past profits, which aggregate more than their paid up capital. Not at all bad as times go, and if the Indian tea industry never does worse, the planters will have little cause to complain. Of Ceylon and its miraculous climate and bounteous soil all travellers speak with enthusiasm. It has been held by some to be the Roman Taprobane referred to by Milton in the great vision of Roman power in "Paradise Regained."

From India and the golden Chersonese,
And utmost Indian isle Taprobane:
Dusk faces with white silken turbans wreathed.

By others it is considered to be the local representative of the Paradise of Scripture. If not, travellers say it at least ought to have been, as no place on earth better supports the Paradisaical characters. And then does not Ceylon boast her "Adam's Peak"—named after the universal progenitor—a mountain more than 7,000 feet high, which, however, ranks only fifth or sixth in the mountain scale, the highest being over 8,000 feet above the sea level The dimensions of this Eden of the terraqueous globe are about one-sixth less than Ireland. Scotland also affords a scale of comparison; Scotland containing a trifle more than 30,000 square miles and Ceylon 24,500. Great already in performance, Ceylon is still greater in what she promises, and well merits the admiration of those ardent travellers who describe her as the most gorgeous jewel in the imperial crown.—Yours, &c.,

BROOKE, BOND & Co.

17, Piccadilly, Manchester, November 7th, 1890.
—*Manchester Courier.*

THE ASIATIC QUESTION IN MAURITIUS AND NATAL.

The *Natal Mercury* is afraid of that colony being overrun with "Hindus" to the same extent as Mauritius. Here is an extract from a recent editorial:—

We find in the *Commercial Gazette*, of Mauritius, of September 30th, an article that deserves the serious attention of all who are interested in what is known as the "Asiatic question." Mauritius, it must be remembered, is an island that cannot be said to have had any aboriginal population. Its people are either immigrants or the descendants of immigrants. They are the offspring of European occupation, and are only "native" in the sense that whether they be white or coloured they have for so many generations, as the case may be, been born on the soil. Thirty years ago the population of the island was represented by the European creoles—mostly of French extraction—by a few British merchants and planters—the two classes forming the aristocracy of the community—and by a much larger proportion of Asiatics from India and China, who represented the "lower" and labouring classes. At that time the island presented a picture of sugar plantations, owned by European colonists and worked by coolie labourers, with a moderate admixture of colonial creoles, and in the towns and villages of small "Malabar" and Chinese traders. A large breadth of the soil was still covered by forests that added to the beauty of the landscape and tempered the conditions of the climate. There had been occasional epidemics of cholera; but as a rule the health of the island was fairly good; the fever period only made its appearance in 1864. Little by little since then the Asiatic element has more and more taken possession of the soil, and fever has more and more established itself in the community.

Now we find a journal fairly representative of public opinion in a colony whose only industry has been developed by means of Indian labour, deliberately proposing that the supply of that labour shall be arrested, as a measure of sanitary and social salvation. Which may be the "neighbouring colony" from which it is proposed in future to draw the stream of immigration we are not told, nor does it matter. Mauritius, as we have said, has no vast reservoirs of native population to draw upon, and the proposition, therefore, as compared with our own case is all the more striking and suggestive. Such an experience and example cannot possibly be ignored. The Indian population of Mauritius—an island of some 713 square miles—numbers, say, 317,121. It has overrun and swamped the island. It has denuded it of trees; it has corrupted the climate, and it has driven out European trade from the hands of all but a few wholesale firms; in other words, it has converted a European colony into an Asiatic settlement. These are startling and ominous facts, and they ought to command the gravest attention of our legislators Mauritius is witnessing the full fruition of evils of which we already see and feel the beginning in Natal.

THE PERFECTION OF CLIMATE IN AMERICA.

From an American friend, a merchant—who has hitherto been settled in Philadelphia, we have the following under date 3rd November:—"Last winter my wife's lungs seemed ailing and we spent the cold months in the south. The change had a beneficial effect, but our doctor here thought the splendid climate and high altitude of Colorado was needed, so we spent the summer there. I think my better half has scarcely a trace of lung weakness today, and we enjoyed Colorado Springs so much that we are going to settle there permanently. I have been much in Virginia, and have travelled extensively (elsewhere) in this country, but have never seen such a climate as that of Colorado, nor so charming a place for residence as Colorado Springs."

THE CULTIVATION OF THE COCA PLANT, and the manufacture therefrom of the drug known as hydrochlorate of cocaine, is to be tried as an experiment at the Government cinchona plantations in Bengal. The suggestion that it might be advisable to attempt the manufacture of this valuable and costly drug in this country, came some months ago from the authorities at the India Office.—*Bombay Gazette.*

TECHNICAL EDUCATION IN INDIA.—One of the most admirable features in the scheme of technical education worked out by Mr. Mackenzie in the Central Provinces, is the prominence given to instruction in the principles of agriculture. For this purpose, as we noted some time ago, a primer for use in primary schools was recently drawn up by the Director of the Agricultural Department, and it has now been determined to make instruction in this handbook compulsory in all rural schools. Already the Inspector-General of Education reports that the subject is very popular both with the pupils in these schools and with school committees in rural tracts. The great difficulty is to provide teachers who can impart the lessons of the primer in the vernacular, which is obviously the only medium by which the classes in the rural schools can be reached. For this purpose a vernacular class for teachers will now be added to the English agricultural class at Nagpur; an additional teacher with a diploma from the Poona College of Science will be employed for the purpose of giving to selected masters from the village schools a course of practical instruction in the primer through the medium of the vernacular; and, finally, small scholarships will be provided for the teachers so selected, so that two may be sent in from each district half-yearly for a six months' course at Napgur.—*Pioneer.*

RUBIES AND SAPPHIRES IN SIAM.

We (*Bangkok Times*) hear from London that the Rubies and Sapphires of Siam Company have appointed a Mr. Gibbons as their gen ral agent in this country and that he has already started for Bangkok. Mr. Gibbons, it is said, will also act as local agent for the Gold Fields of Siam, Ltd. From a reliable quarter we hear that the Rubies Company has been satisfactorily floated in London with a capital of $300 000, and that from the preliminary arrangements already made at Krat and Chantaboon, the shareholders will probably make a good thing out of it.

MAURITIUS.

PORT LOUIS, Nov. 8th.—SUGAR, THE WEATHER AND THE CROP:—The season is very favourable for manipulation, and the mills are working with great activity. In certain quarters the yield is far superior to that of last year, whereas in others, the contrary is the case. We believe that we are in a position today to predict that the general production will be below that of last crop.

VANILLA.—There has been a good demand for fine qualities. We have to quote the sale of a few lots first quality at R16 to R17 per kilo above 6 inches 2nd quality at R14 to R15 per kilo above 6 inches. We fully confirm our valuations as regards the outturn of the coming crop which will not exceed 14,000 kilos.

ALOE FIBRE.—Remain nominally quoted from R240 to R250 the ton for first qualities. But very few factories continue at work.

COFFEE.—Owing to successive arrivals, market for this article closes dull and good qu lity of Ceylon is selling at R56 to R60 per 50 kilos. Réunion may be quoted nominally at R60 and mixed triage qualities R35 to R50 per 50 kilos, according to quality.—*Merchants and Planters Gazette*.

CARP FISH FOR, AND IN, CEYLON.

Mr. W. R. Tringham of Nuwara Eliya, deputed by the Assistant Government Agent, came down to Colombo on a special mission to meet the S. S. "Ma'da" and take charge of a consignment of Carp ova of a new species sent from Madras—the Nilgherries doubtless. But when Mr. Tringham got on board, it was to find that all were dead, to judge by the putrid stinking water in the receptacles. Had they been in order this consignment was to be taken to the lakelet in the Pavilion ground, Kandy.

However, Mr Tringham's trip to Colombo was not quite wasted, for he brought down with him som lively specimens of our Ceylon Carp to place in the fountain basins in Gordon Gardens. This has been done successfully; but today Mr. Tringham found one of them had been attacked and damaged considerably, possibly by a crab. However the others seem all right.

THE JAMAICA BLUE BOOK.

THE GOVERNOR'S MINUTE ON THE DEPARTMENTAL REPORTS.

We (Jamaica *Gleaner*) have received the Departmental Reports of the Colony for the year 1888-89. In summing up his report on these, His Excellency the Governor remarks:—

The year 1887-88 marks the end of a period of depression. It opened with a deficit in Public Revenue of £12,628 and closed with a surplus of £30 054. This surplus had increased by the end of the year under review to £56,538. The growth of prosperity thus indicated has been maintained, and promises to continue. The preceding précis of the reports of the various Departments, which treat in detail of the different subjects under which the business of the Island is classed show how steady an improvement is maintained in every Department. The number of Schools has increased from 771 in 1888 to 826, and Industrial Schools are about to be erected, at Hope Botanical Gardens for boys, and at Shortwood Female Training College for girls. The establishment of these schools will obviate the necessity of sending more waifs and strays to be brought up in the Boys or Girls Reformatories where they are exposed to the contaminating effects of association with vicious and criminal children. This Government Savings Bank shows an increase of 185 in the number of Depositors, and of £14,963 in the total amount of deposits.

THE FRUIT TRADE AND THE ABANDONMENT OF SUGAR.—The fruit trade, especially that in bananas, is daily expanding and to meet the wants of the local growers the telegraph system is being rapidly extended. The cultivation of sugar shows a decrease as steady as that of bananas shows an increase, and there seems every probability that the cultivation may be further restricted. The cause of the abandonment of the estates is attributed to the low price of sugar, and in some cases to the difficulty of obtaining labour. No doubt heavily incumbered sugar estates belonging to absentee owners do not pay under the present system of cultivation of the canes and manufacture of sugar and rum. But with the separation of the business of manufacture from that of cultivation, and the concentration of the planters' attention on the improvement in the cultivation, and the quality of the cane, sugar growing would be a safe and profitable investment. It is much to be regretted that the cultivation of sugar estates should decrease for the sugar cane, unlike the banana, cannot be destroyed by a hurricane, and this offers a steady field for labour in the event of such a calamity. The difficulty of obtaining labour is no doubt serious. That there is difficulty is not to be attributed to the laziness of the population but rather to their determination to invest in land, and to work upon it for their own profit. The consequence of this determination is a gradual migration from the plains to the hills, where land can more readily be secured, and where a very thriving peasant proprietary has sprung into existence, and these owners have become the principal producers of fruit.

THE CAPABILITIES OF THE ISLAND.—But however satisfactory are the statistics of the Blue Book, they can give no idea of the value of Jamaica as a whole or of the extreme beauty and great capabilities of the Island. Of the area of 4,193 square miles, but 646 square miles are flat. The remainder is mountainous, and in the East the Blue Mountains attain the height of 7,000 feet. The mountains are composed of white and yellow limestone, carbonaceous shales, granitic and conglomerate rocks, with alluvial valleys. The climate is particularly healthy if ordinary precautions necessary in the tropics are observed, and while in the mountainous interior the temperature ranges from 60 deg. to 75 deg., even the tropical temperature of 80 deg. to 85 deg. near the sea level, is assuaged by the sea breeze during the day, and the cool land breeze that at night flows down from the hills.

With such variety of temperature, aspect and soil, the range of production is very wide and the Island offers excellent investments for agriculturists with comparatively small capital.

COCONUTS AND CINNAMON IN CEYLON.

KADIRANA, Dec. 6th.—Nice showers since the 1st, and promise of more; a little over 2 inches have fallen already this month. Almost before one bud on the cinnamon bushes has matured, another has made its appearance, and promises to be a pretty heavy one. This is rather rough upon those who waited till the first bud matured before commencing peeling; while those who worked through the bud have scored. Coconut crops continue to be good, but next year must see a great falling-off in yield. Mr. J. D'S. Raja-

pakse, Shroff Mudaliyar of the Negombo Kachcheri has become the lessee of Mr. Tudor Rajapakse's cinnamon properties in this district at, I believe, R6,000 per annum.

NOTES ON POPULAR SCIENCE.

BY DR. J. E. TAYLOR, F.L.S., F.G.S., &C. EDITOR OF "SCIENCE GOSSIP."

Messrs. Carter, the well known English seed merchants, have raised a new kind of barley, with branched spikes, resembling the Egyptian wheat one sees in old Biblical pictures. Now, a branched barley, with a short stout haulm to support it, might turn out a wonderful result to the grower. We want some young agriculturist to back his own opinion, and go in for trying a few acres of it. He might select the best seeds from the best plants, and sow them for results. If he succeeded, he would make money—if he didn't he would be no worse off than if the mildew had destroyed his crop. This branched barley was raised from a "freak;" and there is no reason why many "freaks," should not be utilised. A Massachusetts farmer had several lambs born, with short, stumpy legs. His flocks had legs too long, as a rule, for they were all over the country, like so many greyhounds. Fences could not keep them in, and they caused both a good deal of trouble and a great deal of blasphemy. So the cute Yankee breeder saw his chance. He bred from the short, stumpy-legged sheep that could not possibly wander; and in this way was raised the now celebrated breed of "Ancona sheep."

The United States Government have established at Washington a hospital for diseased plants. It differs from oridiuary hospitals in this respect—that the injuries and disorders from which the vegetable patients suffer are purposely inflicted on them by the doctors of the establishment, in order that the nature of their complaints may be studied, and methods for curing them may be discovered. It is under the well-known Department of Agriculture, which has agents in all parts of the States, whose business it is to collect specimens of diseased plants, and to forward them to this Vegetable Hospital. It is now known that nearly all the diseases of plants are caused by parasites, of which nearly fifty thousand different kinds are recognised. The parasites are carefully studied, and are developed in a gelatine culture. Healthy plants are then inoculated with them, and the progress of their various diseases is in this manner carefully studied. By this process, Professor Gallagher, who is at the head of the laboratory, has found it possible to throughly understand and cope with 12 different diseases of the grape-vine alone. A cure has also been found for the "fire rot," which turns the limbs of pear trees black, and rots them quickly. It is stated that the professor has similarly found means of attacking and routing the fungoid parasite which causes the potato disease.

The following is a capital recipe for naturalists who collect:—To preserve the colours, shapes, &c., of tropical fishes, corals, sea anemones, jelly-fishes, &c., make a mixture to suit of glycerine and gum. Both are mixable with alcohol, but care is required in the operation.—*Australasian.*

THE LANKA PLANTATIONS COMPANY.

There is no Plantation Company connected with this island whose Directors afford such full and detailed information to their shareholders and the general public as do those of the Lanka Company. We have been favoured with a copy of their latest Report which will be found in another column, and which proves no exception to the excellent practice hitherto observed. This Report is well worthy of attention from all who take an intelligent interest in the great planting enterprise of the Colony. The Lanka Co. has had an unusually trying experience, because its existence is coinciden with the decline and fall of the coffee production of the island. No one at the time the Company came into existence believed that the splendid properties taken up on its behalf, could have suffered as they have done, and that too, notwithstanding the most careful supervision and liberal cultivation. Again, the Directors, naturally enough under the circumstances, refrained from launching into "tea" so early as they might have done, and as we know was urged on them from this end. Indeed, their then Ceylon Manager who devoted himself to the interests of the Company in the most earnest, indefatigable way, was able to place within the Directors' offer, at an early stage in our tea history, some splendid bargains in tea—notably a well-known Dolosbage estate then in the market for R25,000—but Ceylon tea planting was scarcely regarded in London at that time as beyond the stage of a speculative enterprise and with all their trying experience of coffee and cinchona, it is no wonder that the Lanka Directors were chary of another bold venture. Now, however, that the tide has turned for our planting enterprise, the Lanka Company holds an exceptionally strong position with no less than 1,468 acres under tea, 980 still remaining of good coffee, and 371 acres of very valuable cacao which last yielded a crop considerably above the estimate in the season reported, so making up a considerable proportion of the receipts. In respect of coffee, it is worthy of note and as shewing the hard luck in every way of earlier years, that while for 4,991 cwt. sold in 1881-2, only £16,000 was got, for one-third that quantity—or 1,649 cwt.—in 1889-90, no less than £8,145 was obtained. In other words the average price netted for our old staple has risen nearly fifty per cent in eight years. We may hope then that in every sense the corner has been turned, and that both as regards crops and prices, a good time is before the Lanka Plantations Company. The Directors and shareholders undoubtedly deserve well of Ceylon, and we trust the dividend declared on the present occasion is but the harbinger of returns which will more than make up for all past losses. *Floreat Lanka!*

THE FALL OF 14·47 INCHES IN 4 HOURS IN MEDAMAHANUWARA CONFIRMED.

HAS IT EVER BEEN EXCEEDED?

Rangala, 9th Dec.—Please tell your Koslanda correspondent that the 14·47 inches of rain really fell in Medamahanuwara in 4 hours (no practical jokes, &c.) and was correctly measured, being confirmed by two adjoining estates, one superintendent measuring 12·62 and the other found his gauge full at 11 inches. Had this gauge been large enough I expect it would have shown a heavier fall even than 14·47, as it generally gets the heaviest rainfall in the district.

[The greatest fall recorded for Colombo is 11·90 inches in 24 hours on 4th-5th May 1876; and for upcountry, but also for 24 hours, 18·80 inches at Padupolla. We suppose, therefore, this fall at Medamahanuwara to be unique in our meteorological records?—ED. *T. A.*]

COFFEE IN WYNAAD: THE OLD STORY.

We hear very unfavourable accounts of the outturn of coffee in Wynaad. Estimates formed when the blossom had set, have turned out most disappointing; instead of so many tons only as many bushels have been picked.—*S. of I. Observer*, Nov. 29th,

THE LANKA PLANTATIONS COMPANY, LIMITED.

Directors:—George Allen, Esq., Sir R. P. Harding; Edward Pettit, Esq., Sir Herbert Bruce Sandford, K. C. M. G.—Agents in Colombo—Messrs. J. M. Robertson & Co. Secretary—Mr. William Bois.

Authorised capital, £200,000 in 15,000 Ordinary shares of £10 each, and 5,000 preference shares of £10 each.

REPORT.—To be presented at the Tenth Ordinary General Meeting of the Lanka Plantation Company, Limited, to be held at the Offices of the Company on Wednesday, the 3rd Dec., 1890, at 3 o'clock in the afternoon.

1. The Directors submit their Report for the twelve months ending 30th June last, together with the Balance Sheet and Account of the Company made up to that date.

2. The Coffee Crop was 1,649 cwt., against an estimate of 1,438 cwt., and the amount realised therefrom was £8,145 2s 9d, a return of 18 cwt. less than last year, but upwards of £416 more in value. The following statement shows the quantity of and the amount realised in each year since 1881, omitting fractions of hundred weights and pounds.

COFFEE CROP FROM 1881 TO 1890 AND WITH PROCEEDS.

Years.	Ampittiakande.	Arnhall.	Fruit Hill.	Fordyce & Garbawn.	Gonagala & Paramatta.	Rappahannock.	Rillamulle.	Thotulagalla.	Yattawatte.	Total.	Average Net Price.	Proceeds.
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.		£
1881—1882...	687	687	304	598	563	1008	96	1044	...	4991	66/11	16,704
1882—1883...	520	1154	43	256	494	363	210	1350	83	4476	74/9	16,735
1883—1884...	985	975	100	487	314	783	251	1262	211	5373	61/10	16,618
1884—1885...	831	619	199	341	658	793	322	1683	49	5499	59/	16,241
1885—1886...	316	550	61	453	275	119	75	540	23	2416	66/8	8,060
1886—1887...	621	564	73	304	518	384	117	829	10	3426	86/1	14,891
1887—1888...	159	84	(all tea)	434	268	324	78	234	...	1601	73/10	5,910
1888—1889...	139	195	"	59	354	429	68	409	11	1667	92/3	7,728
1889—1890...	161	215		217	395	63	41	556	...	1649	98/8	8,145

3. The Cinchona Bark shipped has been 62,298 lb. which has been realised, and has produced £83 907 1d. A slight improvement in this market has taken place, and at present there seems some prospect of a further advance. The Directors therefore propose to harvest more of this product if the prices become satisfactory.

4. The quantity of Cocoa estimated was 600 cwt., and the crop produced 684 cwt., realising £3,223 3s 3d. The cocoa trees are looking well, and there is every prospect of a larger return than has hitherto been obtained.

5. The cardamoms have produced 5,596 lb. nearly twice the estimated quantity (3,000 lb.) The amount realised was £298 7s.

6. The tea received from the Fordyce, Gonagalla, Fruit Hill and Ampittiakande estates has amounted to 231,999 lb. (of which 38,650 lb. only was made from purchased leaf), in addition to which 1,050 lb. were sold in Ceylon. The proceeds amounted to £10,050 15s 4d, and it is hoped that a larger return will be obtained this year without purchasing outside leaf. The green leaf sold from the estates where the Company have no factories was 112,030 lb.

The following Statement shows the acreage and state of cultivation of the Company's Estates on the 30th June last—

Estate.	Coffee.	Cinchona.	Tea.	Cocoa.	Cardamoms	Rubber and Sapanwood.	Grass.	Pattina.	Forest.	Total.
Ampittakande...	95	...	193	...	...	...	2	8	34	332
Arnhall ...	134	40	124	...	...	...	15	35	25	373
Fruit Hill ...	...	...	220	...	...	...	...	...	...	220
Fordyce and Garbawn ...	130	...	326	...	...	...	23	...	135	614
Gonagalla and Paramatta ...	165	...	141	...	...	...	...	15	1	322
Rappahannock..	105	56	185	...	...	...	20	62¼	45	473¼
Rillamulle ...	46	...	175	...	15	...	2	...	20	258
Thotulagalla ...	305	...	77*	...	...	...	...	143	53	558
Yattawatte ...	...	...	45	371	29	45	75	105	277	947
	980	96	1468	371	44	45	137	368¼	590	7409¼

* Partly in Coffee.

The Directors regret exceedingly the death of Mr. J. T. White, who was their esteemed colleague for nine years, and whose experience in Ceylon was of considerable value. As the Shareholders are aware Mr. White retired at the last meeting and it was not considered necessary to fill up the vacancy then created.

Mr. Gerge Allen and Sir Herbert Bruce Sandford retire on this occasion, and being eligible offer themselves for re-election.

Mr. John Smith, the Auditor (a Shareholder), also retires and offers himself for re-election.

The Directors regard the system of management, which has been in operation during the year 1889-90 as very satisfactory, and they believe that the best possible results have been obtained, and they hope the improvement which has taken place in the position and prospects of the Company will be maintained. Every economy which can with safety be effected is brought under their notice and gradually the cultivation of Tea is being extended. During the past year 200 acres have been planted, increasing the acreage of the Tea Gardens from 1,268 to 1,468 acres.

TRADING ACCOUNT FOR THE YEAR ENDING 30TH JUNE, 1890.

Dr.			£	s.	d.
To Cost of Cultivation in Ceylon, viz.—					
Ampittiakande ...		...	2,640	10	7
Arnhall ...		...	942	15	2
Fordyce and Garbawn		...	4,418	12	2
Fruit Hill ...		...	1,347	8	5
Gonagalla and Paramatta		...	469	5	3
Rappahannock ...		...	1,370	11	8
Rillamulle ...		...	556	19	1
Thotulagalla ...		...	1,813	3	8
Yattawatte ...		...	1,689	14	11
General Expenses ...		...	214	10	10
			15,463	11	9
Less—Debit to Suspense Account.—Special Expenditure on Factories	1,334 6 9				
Tea Planting ...	733 14 3				
			2,068	1	0
			13,395	10	9

To Insurance	113	1	4
To Balance carried down ...	8,992	5	4
	£22,500	17	5
To Interest on Loans, &c. ...	790	18	9
To London Expenses.—			
Directors' Fees, Secretary, Income Tax and General Office Expenses ...	909	2	1
To Balance carried to Profit and Loss Account	7,292	4	6
Cr.	£8,992	5	4
By Net Proceeds of Coffee sold in London	7,791	11	9
Do. do. Bark do. ...	783	9	1
Do. do. Tea do. ...	10,029	8	4
Do. do. Cocoa do. ...	3,223	3	3
Do. do. Cardamoms do. ...	298	7	0
	22,125	19	5
By Net Proceeds of Coffee sold in Ceylon	353	11	0
Do. do. Tea do. do. ...	21	7	0
	£22,500	17	5
By Balance brought down—Gross Profits	8,992	5	4

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING 30TH JUNE, 1890.

Dr.			
1889—July 1st.—To Balance brought from 1888-9 Account	1,458	0	5
1890—June 30th.—To Dividend paid on Preference Shares for half-year ending 31st Dec. 1888	415	7	0
Half-year ending 30th June, 1889...	415	7	0
	830	14	0
To Amount written off for depreciation of Machinery and Buildings, and in respect of Expenditure on Tea Planting, &c.	1,220	4	3
To Balance carried down ...	3,783	5	10
Cr.	£7,292	4	6
June 30th.—By Balance brought down	3,783	5	10
Less—Interim Dividend for half-year to 31st December, 1889, on Preference Shares already paid	415	7	0
	3,367	18	10
Memo—To pay.—Dividend on Preference Shares for half-year to 30th June, 1890	415	7	0
A Dividend of 3/ per Share on the 15,000 Ordinary Shares	2,250	0	0
	2,665	7	0
Balance to carry forward ...	£702	11	10

I have audited the above Balance Sheet and Profit and Loss Account, and in my opinion, they are properly drawn up, so as to exhibit a true and correct view of the state of the Company's affairs shown by the books of the Company. JOHN SMITH.

November, 1890.

BALANCE SHEET.

Dr.	£	s	d
To Capital.—			
15,000 Ordinary Shares of £10 each	150,000	0	0
1,420 Preference „ £10 each	14,200	0	0
	£164,200	0	0
Unissued 580 Preference Shares equal to £5,800			
To Loans ...	12,000	0	0
To Sundry Creditors—			
Bills Payable ...	7,650	0	0
Sundries ...	934	12	7
	£8,584	12	7
To Balance of Profit and Loss Account	3,367	18	10
Total ...	£188,152	11	5

30th June 1890. Cr.	£	s.	d.
By Estates—			
Ampittiakande	26,225	5	0
Arnhall	18,521	6	9
Fordyce and Garbawn ...	16,149	2	0
Fruit Hill	10,195	5	7
Gonagalla and Paramatta ...	18,185	12	11
Rappahannock	27,846	10	7
Rillamulle	10,333	11	9
Thotulagalla	35,143	13	1
Yattawatte	6,083	13	9
	163,684	1	2
By Cash—			
At Bankers, Deposit Account ...	3,500	0	0
„ Current Account ...	61	11	1
In hand	1	19	4
	3,563	10	5
„ Payment on Account of Up-keep, 1890-91	561	19	3
„ Produce Unsold on 30th June, since Realized—			
Coffee	2,224	18	6
Bark	784	11	1
Cocoa	309	5	6
Tea	2,432	9	6
Cardamoms	33	8	8
	5,784	13	3
„ Sundry Debtors	589	6	8
„ Machinery, &c.	2,050	4	4
„ Suspense Account—			
Balance 30th June 1889 ...	11,070	19	7
Expended on Factories, Machinery, and on Tea Plantings during 1889-90	2,068	1	0
	13,139	0	7
Less—Amount charged to Profit and Loss Account for Depreciation	1,220	4	3
	11,918	16	4
	£188,152	11	5

The opinions expressed by the Directors at the last Meeting have proved to be correct; for the year 1889-90 has resulted in a profit of £7,292 4s 6d—not a large amount certainly, but sufficient to have enabled the Company to pay a dividend of 3½ per cent. on the Ordinary Shares had not the dividends on the Preference Shares to the amount of £830 14s been in arrear and a debit balance of £1,458 0s 5d to be discharged, both these sums having been satisfied, the Directors are able to recommend the payment of the dividend of 6 per cent. on the Preference Shares, and also of a dividend of 3s per share on the Ordinary Shares.

The Directors believe the estimates of crops and of expenditure for 1890-91 have been made with the greatest possible care, but the uncertainty as to the rates of exchange which will prevail precludes the formation of any reliable opinion as to amount of profit which will be gained.

A summary with the details and the report of the Agents may be seen at the office. By Order,

WILLIAM BOIS, Secy.

No. 8, Old Jewry,
15th Nov. 1890.

THE LANKA PLANTATIONS COMPANY.

(*Communicated.*)

The Lanka Company, in common perhaps with the several ventures in Uva, has been representative to a great extent of the many instances in which concerns which flourished exceedingly in the old days of successful coffee planting found themselves face to face, when that form of cultivation failed, with the necessity for its gradual abandonment and the planting of the several estates it possessed with the tea plant. To effect this the lapse of years has been necessary, and such profits as could be made during this period, had to be devoted to the operation we have referred to. That this has at length fully accomplished,

and that the cost of doing so has now been entirely met and the resultant indebtedness wholly wiped out, is significant of what it has been possible for wise administration and judicious moderation with respect to current profits to effect. And the result to the exercise of such administration and of such judicious moderation is now to be seen in the strong position to which as you well remark, the Lanka Company has at length attained. It commenced the operations of the current year wholly free from the debt which has for so long weighed upon it, and its directors will be at liberty to divide the anticipated profits among its long-suffering and patient shareholders.

That this end has been achieved is convincing as to the remunerative character of the local tea-planting industry. No more striking proof, indeed, of this could be found than the rehabilitation of the Lanka Company affords. It surpasses in the efficiency of such proof even the large dividends that Tea Companies of more recent establishment have been able to declare. I feel every confidence that erelong the announcement which the Lanka directors are able to make will be followed by that of similar results by those of the several Uva Companies who have had to struggle against adverse conditions of a similar type. When this consummation has been fully attained we may expect no longer to see the list of dividends declared by Ceylon Tea Companies qualified by the inclusion in it of what have been to all appearance—so far as the uninformed British public could judge—of perfectly negative results in the case of some such Companies. I can feel no doubt that this improved state of things must have a very marked effect upon the general credit assigned to our local tea enterprise, so that it must conduce to a further extension of tea cultivation in Ceylon. It is to be hoped that Russia, America and Australia may speedily become large customers for Ceylon tea direct, so as to take off a goodly part of our yearly increasing exports.

When noticing the Reports issued of recent years by the Lanka Company you have expressed your appreciation of the very full information they contained as to the prospects of its several properties. The giving of this information was, as regards the generality of similar reports, a wholly new step, but one which has been fully justified by the proof now afforded of the accuracy of what was predicted. At times during the troublous period through which the Directors have now successfully passed, their course of action has been strongly criticized. No doubt it was a hard trial to the shareholders to have to wait year after year without return for their investment, but the logic of accomplished facts will now have fully justified the wisdom of the course to which at times so much exception was taken.

COFFEE *V.* TEA.

(*By an Old Hand.*)

Tea planters would do well to study the relative positions of these staples as regards deliveries (consumption) in the non-producing countries of Europe and America. Some idea may be formed of the vastness of the coffee enterprise by reducing to lb. the enormous deliveries said to have taken place in Europe and America in one month. March last, viz 62,000 tons = 138,000,000 lb. !—*Vide* Rucker & Bencraft's Coffee Circular published in *Ceylon Observer*, 1st Dec. 1890. The above weight is about equal to the annual deliveries of Indian and Ceylon tea combined, in the countries mentioned. Ceylon's coffee contribution for 1890 will be only about 4,000 tons for distribution in all countries.

Gow, Wilson & Stanton, in their circular dated 14th Nov. 1890, state that as regards home consumption of teas as taken from all the bonded warehouses in the United Kingdom for 5 months—1st June to 31st Oct.—China actually increased by half-a-million lb. as compared with the previous year. For the same year and for the same period Ceylon tea increased by 3 millions only, say at the rate of 7 1-5th millions only for 12 months! New markets are, therefore, urgently wanted.

Tea and coffee differ but little in the value per lb. just now, *e. g*:—

1 cwt. = 112 lb. @ 1d. = 9s 4d.
@ 11d. = 102s 8d.

102s 8d. = 1 cwt. tea at present average price of 11d per lb.

104s 6d = present price per cwt. of Ceylon middling plantation coffee.

DRIFT TIMBER.

To judge from all recorded facts, Ceylon would appear to be in the direct line of some ocean current or currents setting direct from Burma or the Malay Peninsula. At all events, if such currents do not flow in a direct line thence, the effect of a combination of them is to carry drift timber from these Eastern and North-eastern shores to those of Ceylon. And it further appears to be certain that these currents impinge finally upon the north-eastern coast of this island.

Unless it be upon some such conclusion, it would be impossible to account for the number of teak logs which are occasionally drifted ashore along the line of coast in which Mullaittivu may be said to be the centre. We believe that it is chiefly along this line of seaborde that the *flotsam* and *jetsam* of such logs occur, and as they arrive sometimes in considerable numbers, it may fairly be concluded that they have all had nearly the same starting point. All the timber which is so cast upon our north-eastern shores possesses evidence of having been felled and prepared for transport. It does not consist of merely the trunks of trees which have been uprooted by some natural force, the logs in every instance almost, having the holes at their ends which have been cut for the purpose of permitting traction. We know that trees so cut in the timber forests of Burma and the Malay Peninsula are allowed to float down the rivers from the sites where they are obtained to the coast line, and it is conjectured that it is such pieces as escape arrest at the river mouth which float seawards on their western journey and eventually come to land, as we have said, along our eastern, and specially on our north-eastern coasts. Everyone knows the value of Rangoon teak. It is preferred here, as elsewhere, for very many purposes, and consequently possesses a high value. Our *Government Gazette* often contains advertisements of sales being made of such timber; but as a matter of fact, we learn that all drift timber washed ashore from the sea is treated as "wreckage" under the first clause of Ordinance No. 5 of 1861, and the net proceeds realized by its sale are credited not to our general revenue, but to the Imperial Government. The amount is trifling however. We cannot give the exact sum so credited for timber alone; but the following are the sums credited to the Imperial treasury on account of unclaimed wreckage of all kinds since 1885:—

	R	c.		R.	c.
1885	759	80	1888	162	06
1886	277	96	1889	225	51
1887	375	73			

We have been told that during the late Mr. Dyke's administration of the Northern Province it

was the exception rather than the rule for the drift timber which reached the very extended shores of that province as it was constituted under that able officer's *régime*, to be offered for public sale. The autocracy of Mr. Dyke's ideas, dictated his resolution to deal with these windfalls from the ocean after a fashion of his own. It was his belief that he could effect a greater service by using up the material upon useful public works than by offering it to the biddings—at that date of a necessarily restricted character—of the few Jaffnese who felt inclined to offer for the timber! The logs were, we are told, all brought to the impounding ground at Jaffna and used by the then Government Agent for such purposes as seemed to him to be good! The fact may, and doubtless does account for the very free use of Moulmein teak in the public buildings in and around Jaffna. As an instance of such free use, it may be noted that the principal portions of the pretty little mission church at Chundikkuli are entirely of this valuable timber, and we have heard that the Missionaries of those days had little or no difficulty in procuring free grants of it for the construction or restoration of other mission churches or buildings. But under the changed circumstances of the last twenty years, it is not desirable that this free hand in dealing with public property should be continued, if indeed it has been continued. We have no doubt, however, that with Mr. Dyke's rule the system we have mentioned came to an end, and that the Imperial Treasury is now credited, as noted above, with the full amount realized by the sale of these waifs of the sea; but how if my "Lords of the Treasury" in England heard of Mr. Dyke's mistaken disposal of their "wreckage" property up to thirty years ago?

MR. WESTLAND'S BRICK TEA.

We have submitted the cake of brick tea to Lieut. de Frisch, the Russian Consul, who has kindly given his opinion as follows:—"It is not nearly so hard—so well pressed—as the brick-tea used in Russia; it is much smaller (a fault easily remedied); the Russian bricks are usually ½ lb. each in weight, marked (like chocolate) by indentations so as to break off easily into six pieces; the bricks are usually of a greyish colour, Mr. Westland's is black. The tea of the latter is, however, very good." We have no doubt that Mr. Westland would very quickly come up to the proper standard with his brick tea, if there were due encouragement, or if he could protect his mode of working for a few years, at a reasonable rate. But until our tea trade with Russia more fully developes and until our exorbitant patent fees are reduced, there is not much encouragement. However, as regards brick tea making, we hear there are locally other "Richmonds in the field."

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Nov. 20th.

CINCHONA.—At Tuesday's auctions a fair average quantity of bark was offered, the catalogues embracing.

	Packages		Packages	
Ceylon bark	1,510	of which	1,204	were sold
East Indian bark	966	do	789	do
Java bark	61	do	61	do
S. American bark	233	do	...	do
Total	2,770	do	2,054	do

The assortment was a poor one, and consisted very largely of Succirubra barks from Ceylon and Southern India, common to medium chips and spokeshavings being particularly prominent. The highest price paid for manufacturer's barks was 10d per lb., and that only or one or two lots. A dull tone prevailed throughout the auctions, and prices were generally easier, especially for fine druggists' barks. The average unit may now be placed at 1½d per oz.

The following were the quantities purchased by the principal buyers:—

		LB.
Agents for the Mannheim and Amsterdam works		122,257
Agents for the Frankfort o/M and Stuttgart works		88,829
Agents for the Brunswick works	...	87,232
Messrs. Howards & Sons	...	59,575
Agents for the American and Italian works		36,854
Agents for the Auerbach factory	...	30,102
Mr. Thomas Whiffen	...	05,256
Sundry druggists and speculators	...	60,405
Total quantity sold	...	510,510
Bought in or withdrawn	...	137,312
Total quantity offered	...	647,822

QUININE very quiet: the only business we hear of this week is 10,000 oz. second-hand German bulk at 1s per oz. The nearest quotations now are 12d per oz. sellers, 11¾d buyers, no business.

SOILS AND THEIR TREATMENT.

We have marked for extract into the *Tropical Agriculturist* an interesting review from the *North British Agriculturist* of what is evidently a very valuable handbook on soils, by Dr. Fream, the historian of the Rothampsted experiments. A point in favour of the Ceylon planters seems to lie in the fact that the roots of tea and other perennial plants, such as are cultivated so largely in Ceylon, are ever in the soil, so reducing the loss of nitrates, to a minimum, probably. It is in fallow land in Europe that the loss of nitrates from drainage is greatest. On the other hand the capillarity of our mountain soils, at any rate, is not increased by the beneficial action of earth worms. We have seen the "castings" of a large species on patanas, but the earth-worms so common and so beneficially active in Europe, seem to be absent from, or very rare on, estates. We do not suppose that the existence and action on some lowcountry estates of white-ants is considered in the light of compensation. In the absence of the soil-digesting and tube-forming worms, *tilth* by means of agricultural implements would seem to be the more imperative. But here are several of our most experienced tea planters asserting that they have seen no good results, from forking of the soil on their estates! All our preconceived ideas having been in favour of the mere stirring of the soil, even without the burying of prunings or the application of manure, we are, we confess, unwilling to abandon them, even on such testimony as that of "C. S. A.," "T. C. O." and other men of equal experience. The stiffness of our soils, which enables them to so great an extent to resist wash, surely renders tillage the more necessary? As regards coffee cultivation and the good effects of merely opening up the soil, there is the famous case on record. A planter dug the usual holes for manure, which he expected the Colombo Agency house to despatch. For some reason the supply of manure never arrived and the holes were left open, except for the loose soil washed back into them. *The following crop was one of the best ever gathered on the estate.* We should like to see the question of forking tea soil further discussed by such planters as "G. A. D.," "T. M.," "A. L. C." and others, and reasons given for what is undoubtedly a heresy in general agriculture, before we give in our adhesion to the new faith. What will Dr. Voelcker say to the dis-

covery that tillage apart from manure confers no benefit on tea? He will probably ask for the essential difference between tea and all other cultivated plants.

THE UTILISATION OF BONES IN AGRICULTURE.

About the latter end of 1889 it pleased the Government of India to display an interest in the export of animal bones from India. The Government of India was under the impression that exports of bones were on the increase. From statistics of trade, however, we learn that as regards this Presidency, at any rate, there was a fall instead of a rise in exports, as the average shipments per annum during 1884-86 were 3,528 tons, while the annual average during 1886-90 was 2,772 tons. This fall is attributed to a dimunition of the Ceylon demand, which is now met more from Australia. At one time, the island obtained almost all its supplies from this Presidency, but it now draws largely from Australia. Looking at matters as the Government of India does, the decrease is matter for pleasure rather than regret on the part of Madras. The gentlemen who study matters from Simla know that bones may be largely used for conversion into manure, and the careful guardians of India's agricultural interests manifest anxiety concerning the "threatened drain of the manurial resources of the country." As regards Madras the dread appears to have been groundless, but it has not been without good results. A report was called for some months ago on the sources whence bones for export are obtained, the extent to which they are collected in the Mofussil, their treatment before shipment, etc.; suggestions were invited for the utilisation of bones as manure in this country; and a summary was asked for of any experiments made. This has brought to the front a considerable amount of information that will interest many, and may be found useful.

Collectors report that bones are not generally used in this Presidency as manure for agricultural purposes, except on Coffee plantations on the Nilgiris, the Shevaroy Hills, and in parts of Malabar and Tinnevelly. Bone manure, it is said, is occasionally applied to coconut trees in the Tanjore district. In South Canara bones in an unbroken state are sometimes burned at the foot of indifferent jack and coconut trees. But most of the bones collected are exported, the greater part going to Ceylon and a few to the United Kingdom. The Tinnevelly and Malabar districts head the list with about 1,200 tons and 2,000 tons, respectively, of exports annually. Ganjam, Kistna, the Ceded districts and Kurnool exhibit very small exports, the highest being about 400 tons from Cuddapah. Godavari exports from 340 to 430 tons annually; Vizagapatam from 100 to 250 tons; and Nellore about 100 tons. Most of the Southern Districts export about 150 to 200 tons. In Madras a single dealer has been exporting about 200 tons annually to Ceylon, during the last ten or fifteen years. In regard to the above supplies it is stated that the bones are collected by chucklers, pariahs and other low castes, who dispose of the carcases of cattle. Sheep and goat bones are rejected in some parts, because they are light, and do not sufficiently reimburse the collector for the cost of getting them together. When the collector has got his supplies ready he conveys them to the Sea Coast, and there sells them to dealers at whatever rates he can get. Apparently the price has recently ranged about 2 annas per Madras maund, equivalent to, say, R11 per ton. On this the dealers have to make a profit before selling to shippers. Owing more, perhaps, to the greater demand than to the increased difficulty of delivering supplies, on the Nilgiris prices are much higher, raw bones being delivered by contractors at a cost of R30 to 83 per ton; while bone dust runs from R40 per ton as high as R70, according to situation.

As a rule the bones are simply dried and broken by hand before exportation. In Malabar, however, and to a small extent in South Canara, they are crushed by machinery and converted into meal for use as manure. They are generally steamed first. Experiments made in this country and elsewhere have established long ago that bones are rendered more active as manure by being mixed with lime, saltpetre, cattle-manure, oil-cake or sulphuric acid, as well as by disintegration, steaming and reduction to ash. And it is mentioned as a proof of the value of bone manure that a Native gentleman tested half an acre of wet land (unmanured) with 375 lb. of bone ash when transplanting paddy seedlings, the cultivation and irrigation being as usual. An adjoining plot of an acre, also previously unmanured, was cultivated without the addition of any manure. The former yielded 720 measures of paddy and 1,260 lb. of straw, *i e.*, 1,440 measures of paddy and 2,520 lb. of straw per acre; while the yield from the unmanured acre was 828 measures of paddy and 2,352 lb. of straw per acre. The increase due to bones ash was thus 612 measures of grain and 168 lb. of straw in one acre. After an experiment made by Mr Lawson of mixing sulphuric acid with coarsely powdered bones and applying them to cinchona plants, it was found that the alkaloids exhibited marked improvement, and other experiments have fully established the advantage of using bone manure. As, in addition, considerable quantities of bones are consumed as bone-charcoal in the Su ir factories of Aska, Nellikuppam and Tutioorin,set would appear that bones might be much more utilird than they are at present, if collection and prepaation were systematically conducted.—*Madras Times.*

ROUNDABOUT PAPERS.

COCONUT ESTATES: EUROPEAN *versus* NATIVE.

There are a great many coconut estates owned by Europeans in Ceylon, and particularly in the Eastern Province, and their methods and modes of cultivation are so different from those adopted by the native owners, proprietors, or village-holders, that it may not be uninteresting to your readers to have laid before them a short account in explanation of the particular ways in which each side work, and the results consequent upon them.

The Englishman begins by thoroughly felling, clearing, and burning his land, leaving as many stumps and large branches on the ground as possible, which will, when thoroughly decayed, go far to enrich the soil in the future. He then lines and holes his land afterwards, planting the young trees in the holes about 23 feet apart, (or about 90 plants to the acre), which experience has shewn to be the proper distance, so that the branches of the tall palms do not lock, or overshade each other, thus allowing (in the future) the sun at mid-day, morning, and evening to warm the soil, for it is found that, if trees are planted closer, it interferes in a great measure with their bearing capacity. The young plants are selected with an eye to their strength and general appearance, a plant with a weedy stem and thin foliage being rejected, one with a thick stem, strong well-set and curly dark green branches being all that is required

Next comes the watering, which must be carefully done, (except of course in the rainy season or when timely showers moisten the ground) for three full years, or even four, after planting.

The proper watering of the young plants is of the utmost importance; each young plant should get a full chatty each time, or from 3 to 4 gallons, and the neglecting of this may in the future have very disastrous consequences. To entrust this portion of the estate work to coolies would be madness, as in order to evade their proper amount of watering, they will divide the contents of one chatty between two or even three plants, and the water will not be nearly sufficient to saturate the roots of the young plants. It is, therefore, necessary to employ an estate watcher, or a Cangany, to supervise the watering gang, when there is some chance of the work being well done.

The trees having once tided over all the hindrances incidental to coconut planting, such as beetles' black and red, porcupines, and wild pigs, and having grown to 4 or 5 years old, they are left to nature, and even then they are liable to beetles and lightning, which prostrates many a fine young and old tree.

Englishmen manure their trees by turning into the ground between the rows all that the tree drops, and tying 4 or 5 cattle at the foot of each tree, where a sufficient trench has been previously made. These cattle are tied there every night, for 3 or 4 nights running, and then removed to a fresh tree, the manured tree having its trench carefully covered up, for the soil to take in.

The nuts are picked once every three months in the season, being taken to the 'barbacues' or drying ground, split into halves with one stroke of a large hatchet, and turned kernel upwards and left to dry in the sun; while at nights the kernels are turned downwards to keep the dew from them. After 3 or 4 days' drying, the kernel begins to shrivel in the shell, and men, women, and children are employed to scoop them out into heaps. This is called the 'copra,' and is ready for sale, and will fetch from £3-10 to £4 per candy of *five* hundredweights.

The native estate owner, or village coconut garden proprietor, opens and plants his land in about much the same manner; but he puts in his plants very much closer, so that one acre of land holds from 100 to 120 young plants not very correctly lined or even properly holed. In many instances he will even plant *two* trees in one hole, but the result will be that they will never bear properly. When once the plants require no watering, he will on large properties leave them to shift for themselves, letting thorny scrub and jungle grow around them, and otherwise neglecting the property; so that it very soon deteriorates in value and bearing capacity. He will never put back into the ground or bury what falls from the tree, or otherwise manure his property, so that nothing ever goes under the soil. But in village gardens, which are kept splendidly clean, and where they are constantly burying dirt and rubbish, the trees come on splendidly and bear beautifully, giving large crops. I stood near a village tree when they were picking nuts, in the spring of last year (1888), and counted 203 *ripe* nuts picked from one single tree.* CATAMARAN.

—*Times of Ceylon.*

RAIN.

The following paragraphs are found in an article in *The Missionary Review of the World* for July, 1890, and are from the pen of the well known missionary philanthropist, Dr. John L Nevius, of Chefoo. The subject of the article is "Famine and the Work of Famine Relief":—"Famine is the result of two opposite causes—drought and flood—which may be referred to one and the same cause, the unequal distribution of the rainfall, producing drought in some places, and floods in others. In that part of Eastern Asia which includes the great empires of Hindustan, China, and Japan, the alternation of the winds of summer and winter are so marked as to produce what are called the northern and southern monsoons, to which the climatic peculiarities of this whole region are to be largely attributed. During the winter months the northern monsoon blows almost continuously, and sometimes with great violence, from the Arctic regions to the tropics. Early in the spring the tropical winds, charged with moisture, commence moving northward, at first continuing only for a few degrees of latitude, but gradually asserting their supremacy, and extending farther and farther northward, until, in July and August, they constitute the southern monsoon, which, on the entire coast of Asia, extends from the tropics to forty degrees of north latitude. The region in which the southern monsoon and the colder breezes of the north meet, like two opposing armies alternately advancing and retiring (the colder atmosphere condensing the vapour with which the southern monsoon is surcharged forms the rain-belt, which, as it advances step by step to the north, brings what is called the rainy season). The rainy season reaches Ningpo and Shanghai, in Central China, the latter part of May, when the rain is almost constant, while north, in the province of Shantung, the sky is cloudless. This monsoon, after discharging its moisture in the south, often continues its course northward for several degrees of latitude with great violence, and almost as dry as the sirocco of the desert. In the latter part of July, and nearly the whole of August, when the air in Central China has risen to high temperature, the southerly monsoon blows past that region, holding its moisture in suspense until it is condensed, and falls in Northern China and Manchuria. These two monsoons, with the fluctuations in their force and temperature, produce the very irregular rainfall of the rainy season. In one section of country there is sometimes such an excess of rain as to form destructive floods, while in an adjacent region, north or south, there is a comparative deficiency. Sometimes the rain falls gently for days, and at other times in such volumes that it is impossible to distinguish objects at mid-day a few hundred yards distant, and water-courses half a mile in width, in which the stream had shrunk to a little rivulet, requiring only a few stepping stones for the foot traveller to pass, in an hour's time becomes a rushing torrent, overflowing its banks, and rendering all passage, for the time being, impossible."—*Chinese Times.*

* This is rather a tall order.

COFFEE PLANTING IN GUATEMALA.—Coffee trees, transplanted from the nursery after a year's growth from the seed, are usually planted 9 feet apart, making 484 trees to the acre; but where the soil is exceedingly rich, at an altitude of 3,000 feet above the sea, they are placed 12 feet apart to prevent interference with each other's luxuriant folliage. Each tree produces 1 to 2 pounds of the berry in *oro* (that is, after being cleaned and polished and ready for the market), according to the soil and temperature, so that the product of an acre of coffee trees would be from 484 to 968 pounds in *oro* At the present price of 23 cents per pound the result would be $111.32 or $222.64 per acre, which, at the average cost of 5 cents per pound for production and transportation to the seaboard, would show a net profit per acre of $87·12 or $174·24, according to richness and adaptability of soil and condition of temperature. —*American Grocer*

THE MANUFACTURE OF RUBIES.—What is the use of exploring unknown and dangerous countries for rubies when the secret of their artificial production has been discovered? This was the question which the Academy of Sciences discussed on the report of MM. Frémy and Verneuil, who for some time past have been making chemical experiments in the manufacture of these stones. More valuable than mere theory was the fact that the two chemists exhibited some hundreds of specimens of the glittering red crystals they had succeeded in producing. The rubies were admitted by all to be much superior to anything hitherto manufactured. No little danger, however, attends the process. The chemicals have to be fused at a heat so intense that M. Verneuil during the course of the experiments nearly lost his sight. While manufacturing rubies the two chemists found that at a certain stage of the operations crystals of the colour of sapphires were produced, but the hue hitherto obtained has not been equal to the hint of the real gem.—*P. M. Budget.*

Correspondence.

To the Editor.

FORKING OR DIGGING TEA—NO. I.

Dec. 1st.

DEAR SIR,—In answer to "Pervert" I have to state that I have seen it tried in many districts, and I cannot say that I have ever noticed any beneficial result in forking alone. In fact as your correspondent mentions I also have noticed a marked falling-off in Tea after forking; this I believe is owing to its being *overdone*, for the breaking of nearly all the feeding roots within 10 inches or a foot of the soil must seriously check the vigour of a tree for a time. Of course from digging in manure the results are well-known to be most satisfactory, and I have also seen digging in prunings in every alternate line tell most favourably on the tea bushes, but *general* digging I have not found good, but I believe if carefully done in every *alternate* row on certain stiff soils at the proper time, it cannot but have a beneficial effect on the tea. V. A.

No. II.

Nov. 30th.

DEAR SIR,—I have found no good results whatever follow forking, unless the operation is accompanied by the application of manure. I have tried it in tea of different ages, and in different soils, with equally unsatisfactory results. T. C. O.

No. III.

DEAR SIR,—Your correspondent "Pervert" is quite right in saying, that there is a great diversity of opinion on the merits of forking tea, the effects of the operation being anything but calculated to inspire *general* confidence.

In Dolosbage with a wet subsoil and heavy rainfall,—the two things, one would say, that were *not* conducive to the success of such a system of cultivation,—several planters swear by it, and in the course of my wanderings I often hear of good results following the forking up of the soil in other districts; but *personally* I am rather disposed to agree with your correspondent, and I have no desire to renew the experiments I have made.

Digging in the prunings and rubbish on the ground, I think does good, especially if *showery* weather is expected. ALPHA.

No. IV.

DEAR SIR,—Digging, in my experience, shows no results whatever on the tea, unless manure is thus applied, when paying results always follow. I would only fork up every other line. C. S. A.

No. V.

Lower Ambagamuwa, Dec. 7th.

DEAR SIR,—I have in my career as a planter had a big share in the digging and forking up of the soil, both in coffee and tea land. My nine years' experience of this work with the latter product is certainly contrary to that of "Pervert." Digging is scarcely at all needed where the soil is of a friable nature unless for the sake of economy: if you were renovating such soil by applying manure, digging it in you will find pay better than the old-fashioned holing system. I say digging is a *sine qua non.* It is perfectly true, and I admit that forking up will and does, as a rule, throw back the flushing tendency of the tea; but this is only what one must naturally expect. Take any other shrub, dig about it in a similar way, whatever its yield is to be you will invariably, nay always, find it on the diminishing after such a process, and for such a time only as your shrub has had to battle with the effects of disturbed nature. But what about the after results? Comment is unnecessary. In 1884, a field of 12 acres tea a year old was to all appearance stunted and far from having a healthy appearance, I resorted to digging as a last resource before finally abandoning the field. In six months after digging, it beat my most sanguine expectations, and today that same field is yielding a considerable crop. This was purely a root-bound field, the soil requiring to be broken up; once the roots had free play the bushes naturally grow and filled out. Digging ought to be periodically carried out where our soil is so apt to get caked up. Apart from this, it is one of nature's requirements. I believe digging up the soil has been in vogue since the creation; does not the good old Book teach us "Break up the fallow ground, dig about the roots"? —Yours truly, C. J.

CEYLON TEA CROPS AND FUEL SUPPLY.

DEAR SIR,—Looking over the Directory I find you estimate quantity of tea to be exported in 1891 at 54,000,000 lb.

I believe the quantity of wood fuel required to make 100 lb. of tea averages about 60 lb., so that fuel is becoming a very important item.

The Forest Department has done a great deal, but undoubtedly thinks too much about showing a profit on its working; but after all "Heaven helps who help themselves," and so proprietors should secure waste land in the neighbourhood of their estates and factories and plant quick-growing suitable trees.

When demand for fuel reaches 14,286 tons a year, it will be a serious matter for those who have forgotten to look ahead.—Yours, TEA POT.

THE WATCH COMPASS.

DEAR SIR,—I am surprised that "Astro" thinks that the watch could never be made to revolve around its hour hand in northern countries. Let him take a circular piece of pasteboard, lay a wire across it, fastening it on by gummed slips, and then pointing the wire to any quarter of the heavens see if he cannot twirl the disk. The hour hand of a watch corresponds to the wire, and the possibility of revolving the watch around it as if it were an axis, does not depend on the latitude of a place. This makes it plain that the watch does *not* "adjust *itself* to the plane of the sun's daily path." It can however be adjusted by taking care to keep that point of the dial which is to indicate south higher than any other point, while the hour hand is pointing to the sun. This might easily be neglected if attention were not called to it, as I believe has not been done thus far, and it would vitiate the whole experiment, and might give a serious error. This omission made the original rule practically valueless. The required adjustment introduces a complexity which lessens the advantage of the watch compass, and "Astro" admits that for five months in these parts the rule has to be altered and for other four months is only approximate. The fact is that anyone with a little ingenuity can tell the points of the compass quite accurately by simply noting the position of the sun, if he only knows the time of day —Yours truly, ANOTHER YANKEE.

THE NUWARA ELIYA CARP AS FOOD-SUPPLY:

SUPPLY OF FRY FREELY AVAILABLE FOR CULTURE IN PONDS, TANKS, &C.

Nuwara Eliya, Dec. 6th.

DEAR SIR,—Will you allow me through the medium of your paper to draw attention again to the excellent food supply that the Nuwara Eliya carp (the Prussian carp) yields.

In Nuwara Eliya they do not grow to any size, probably in consequence of the cold, but at lower elevations they thrive well and multiply amazingly.

Some that I sent in the fry-stage to a gentleman in Deltota last year are now 1½ lb. in weight, and are excellent eating; and the experience of another gentleman in Dimbula, who also had some, is to the same effect.

Any pond will do for them, and if a stream of water runs through it, so much the better.

To insure a supply of fish for the table they should be constantly fed with boiled rice or brewer's grains, when they will rapidly increase in size and become so tame that they may almost be lifted out of the water with the hand.

Any number of fry can be had here. They are easily transported; the only thing necessary being a large chatty slung on a pole with two coolies to carry it.—Yours faithfully,

C. J. R. LE MESURIER.

COFFEE CULTURE:—GREEN BUG AND ITS TREATMENT ON THE AGRAPATANAS.

DEAR SIR,—I should be very glad to respond to the request you make in *Observer* of 1st inst., could I give any more information on the subject, but really I have not much to add to what I have already given, for the simple reason that the comparatively little "bug" that we have had on these estates for the last two years or so has disappeared so quickly and done so little damage, that I have not found it necessary to do anything to it. I think this has been the general experience with good coffee about here, though I know from correspondence that I have had this has not been the case in some other quarters, and to such I strongly recommend the kerosene emulsion treatment supported by good manuring, if they wish to keep up the coffee and get crops. I believe that one of the principal reasons why we have had such comparatively mild attacks of bug is to be attributed to the earlier appearance of leaf-disease for the last few years compared with previous ones, for, I have carefully noticed that the bug begins to show signs of unhealthy life and dying off as soon as this disease really sets in. For the last few years leaf-disease has reappeared much earlier in the year than previously, and the bug has had a much shorter life than when it attacked us several months later. Of course the coffee has only been kept in really good heart by good cultivation. We have kept only the best fields, the rest having been planted up with tea year by year. It goes without saying that where there is not good cultivation the trees are altogether unfitted to stand the combined attacks of even a mild dose of bug and leaf-disease year after year and *yet bear profitable crops.* When I first commenced to apply the kerosene emulsion and lime, the "bug" was in full force and rampant; and I have already explained, that no other treatment (and I tried many experiments) succeeded in both saving the crop and leaving the coffee in good bearing condition. In fact, I lost some very fine coffee bearing heavily side by side with what I treated with kerosene emulsion, and which is still to the front, having given several good crops since then; and though this year's crop is a small one, yet the trees are healthy and promising, and this in spite of a bad attack of grub last year. There are other estates not far from this who can show similar results from following similar treatment, followed with good manuring. Still I think it is more than ever becoming a question as to which pays the better, with such tea as we have in this district, and the good yields per acre we are getting will show what even good coffee has to compete with. You ask for details of cost of application, but I think I have already given you this in a previous letter. The first year (the worst) was some R10 an acre including all cost of labour and materials on some 300 acres treated as I fully explained,—and the next year was about R5 with only part application of lime on some 150 acres; we have spent very little indeed since then.

The labour question would be to some an important one, for where there is much tea it generally takes all the labour to pluck at the time of the year that we get this bug worst, say April-May. Yes the coolies took some time to get into the most economical way of carrying on the work and required a good deal of looking after, but they gradually found it easy enough, or at least this was the case with the picked gangs whom I put on to "follow up" the first general application. We first went straight through all affected coffee, with all hands—merely sprinkling with lime the trees not attacked with bug, then I put on several small gangs of men to follow behind to wash off (simply 'unhinge" is all that is actually required) any bug that was left and to watch for the re-appearance of new life until the leaf-disease came on, when I found nothing further was needed.

I would just mention that as lime is supposed to be bad for tea I tried a thick mixture of liquid cowdung on the principle advocated in the interesting letter "From the Hills" *i. e.* to smother the bug. All I can say is that it seems to have been effectual, but I have not done it on a large enough scale to test the cost. It should be done in dry weather; Of course on some estates this would not be available, and it is a question whether it would not be most valuable as manure.* W. B. J.

"COFFEE is being cultivated successfully in Bavaria," we read in the latest *Graphic.* But it must be a new species of coffee plant—an annual—to judge by the description which follows:—"It ripens well and has an excellent flavour, though tasting more bitter than the original tropical product. The plant is sown in the spring on sandy soil, and produces a delicate blue blossom about July, while the berry becomes ripe in August, being then a pale yellow." We should like to see this coffee, "sown in the spring" and blossoming a delicate blue in July!

FAILURE OF TOBACCO EXPERIMENTS.—In an order which it issued, the Madras Government "regrets to learn that the results of the experiments conducted by Mr. Caine in the growing and curing of tobacco during the last two years have proved to be so unsatisfactory. The reports of the several firms, to whom samples were sent by the Board for opinion, show that the leaves, when cured, were decidedly defective in the qualities required by the European market, and the very poor prices obtained in the local market for the indigenous tobacco, grown under the personal supervision of Mr. Caine, are evidence of the inferiority of the leaf to that raised by the natives themselves." The Government is not prepared to re-engage the services of Mr. Caine.—*Pioneer.* [The question now is, can success be expected in Ceylon, such as has not been attained in India?—ED. *T. A.*]

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* Of course, if there were no bug, but the double advantage of the application is that after smothering the bug and falling to the ground it is still valuable as manure. But how can even the best coffee survive the external attacks of green bug, which gives way only to *Hemileia vastatrix,* while the subterranean enemy grub gives way to neither?—ED. *T. A.*

LEAF WITHERING.

(By the "Peripatetic Planter.")

I have been asked recently what is the best temperature at which to wither leaf. This is a bigger question than appears at first glance, and a reply should not be given didactically, without being supported by a statement of, at least, general principles, even though detailed reasons might be, perhaps, wisely omitted. I should prefer to devote a special article to the question, so that each point might receive its proportionate share of attention, but this I cannot find time for this week. It would involve a consideration of the other question, Why do we wither? and that goes into chemical as well as mere physical changes which we seek to bring about. Suffice it for the present that I think I could show good grounds for never withering at a temperature much above 94 deg.—100 deg., unless a current of air passing over the leaf, by reason of the *dryness* and *velocity* of that air, produces a degree of *rapid evaporation* which by cooling the leaf when it comes in *wet* neutralizes the *extremely injurious* effect of the excessive temperature, and this latter neutralisation depends so much upon the air being of a low "relative humidity" (*i. e.*, being very dry) and also so much upon the leaf being *wet* not dry, and upon careful attention on the part of those in charge of the operation, that if a perfect degree of wither can be accomplished in say 5 hours, in the worst weather with the wettest leaf, with no higher temperature than between 86 deg. and 94 deg. without risks from careless, lack of attention, then, as the room will be vacant for the evening's pluck—the morning's being withered and removed, in the 5 hours—there seems to be no sufficient reason for preferring the more risky higher temperatures. Of course in competent, careful hands a high temperature (with a high velocity dry air current) may be fairly safe—it has yet to be proved so, and is against accepted views—but the additional anxiety and attention required would be a drawback to many, who would rather be not so tied to watching the progress of the wither. I was asked the question, as with a higher temperature than the Blackman system is at present worked at, four or five times the quantity of leaf might, of course, be withered in the same space and with the same appliances—provided the temperature could be maintained, at a reasonable cost in extra fuel, and provided the quality of the Tea were not damaged. Why run the risk and incur the extra expense in fuel? Where is the sufficient reason for doing so? With a temperature between 86 deg. and 94 deg., each "Blackman" in a room has, in *dry weather*, withered 66 maunds of leaf in 3½ to 4 hours: and in *wet* weather has, in the same room, done 33 maunds in the same time between those safe temperatures. Surely those quantities are good enough when the absence of risk and certainty of perfect quality in the "wither" are considered. Whilst speaking of this point, I would correct a mistaken impression or two which I have met with. Trays are by no means necessary with the system referred to. In many factories *no trays* are used. The racks are fixtures; in some cases made of tiers of Hessian cloth, in others, of open fabric woven like wire mesh, but made of hemp. In others they are of woven wire mesh; but in each case the fabric is stretched *from end to end of the rack*—and the leaf is swept off, or jerked off by tapping the under side. In some cases the fabric is stretched on rollers, and wound up, the leaf being spread at one end, and the fabric rolled out as the leaf is spread. The leaf in like manner is taken off by again rolling the fabric, which drops the leaf into baskets at the end.

Next, a factory having no loft above the Manufacturing Room, in many cases employs a good deal of its valuable space, for work such as box making, &c., which can just as well be done in an adjoining building. If this space is thus cleared, and if racks are then erected therein for withering, and the necessary *cutcha* baffles erected in their proper positions, the ground floor is as good for withering by warm air current as any loft would be—and it is surprising how much leaf can be withered in a small space thus won for the purpose from an employment which can be just as well conducted elsewhere. Some factories are already so planned to wither *all* their leaf in spaces thus saved. When speaking just now of one propeller having withered 66 maunds of leaf in 3½ to 4 hours, I should have added, but in this case the racks were withered and emptied and re-filled from a store of leaf. Usually, sufficient space and rack area is provided to make one spread do for the morning's leaf, and one spread for the evening's as usual.

Another mistaken notion I have come across is, that all the leaf will get withered at the same time, and that the rollers won't then be able to work it off fast enough! This I fancy comes of the use made of the words "uniform wither" in the literature of the system. This notion is far from the case. Each *rack* should wither uniformly, so that the boys will not have to pick and choose *different* tiers of the same rack in removing the leaf. That would leave too much to the boys, and *cutcha* leaf might get mixed with withered leaf and spoil the "roll," &c. Each rack can be made to wither uniformly from top tier to bottom tier, by attention to details in erecting the "*chut*" and baffles. But the racks will wither *one after another* (by no means all at once) in their order as they stand *near* the warm air inlet, or *distant* therefrom—and thus there is *no fear* of withering too fast for the "rollers,"—and the current can, of course, be stopped at any time if there is any sign of this in dry weather.—*Indian Planters' Gazette.*

CEYLON TEA IN AMERICA: THE TEA COMPANY.

The following correspondence has been sent us for publication:—

New York, Nov. 7th, 1890.

Messrs. Darley, Butler & Co., Agents & Secretaries, Colombo.

Dear Sirs,—Since writing you on the 25th ultimo, we have your esteemed favour, 2nd ultimo, contents duly noted, also copies of the "Times" paper, containing the copy of Mr. Arthur's letter, and the remarks of the editor, &c. We find that Mr. Arthur, who has been the agent here of a man named Davidson, has gone back to England, and his "Sirocco Tea shop" is said to be closed, and is reported to have been a failure. We are quite averse to going into lawsuits, but it seems rather provoking, that we should be subjected to the attacks of a lot of people who seem to have no especial reputation at stake, and are backed up by [by a portion of] your press. We have taken up the tea business in good faith, but if your press and people intend to spend their time in vilifying us, the quicker we get out the better, as we are not at all dependent upon the matter, either financially or in any other way. It might be well to state to your people, that the only salary paid to anyone in this country, is to Mr. Pinco, and that only enough to keep him in *very* COMPARATIVE COMFORT. If the Company is a success we expect to make some money; if a failure, we will lose time as well as money. Mr. Grinlinton will no doubt ere this reaches you have explained his views about all matters here fully, and we trust to the satisfaction of all concerned, and we trust no time will be lost in advising us, as to all the matters relating to the final settlements with your Co.—Yours very truly, (Signed) Wattson & Farr.

P. S.—Enclosed we hand you copy of our last letter to Messrs. Darley & Butler, which will give you some points as regards the stock, &c., &c.

(*Extract from Messrs. Wattson & Farr's letter to Messrs. Darley & Butler*).

New York, Nov. 7th.

Messrs. Darley & Butler, London,

Dear Sirs.—Your esteemed favors 17th, 22nd, and 25th and 29th ult. duly to hand and contents noted,

We note that you are executing the order for tea, and some will no doubt come forward in due course. As to the statements and letters of Mr. Davidson and Arthur, we can only state that they are in the main lies, and that where any truth appears, it has been so perverted that it is made rather worse than lies. We have tried to find Mr. Arthur, but are advised that his "Sirocco Tea Shop" is closed, and that he has gone to England. The enterprise has proved an utter failure we are told. We have just sent the following cable—"Arthur's tea shop closed, has left country, notify *Times*, we hold them responsible for statements." While we are decidedly averse to enter into law suits, it seems rather hard that we should be subjected to attacks from parties who seem ready to go to any length to damage the prospects of the Company. We have received copies of your *Times* with full letters from Ceylon, and are writing the old Company in detail.

In regard to the surplus shares, after the holders of shares in the old Company are settled with and after the Company is floated and the two hundred thousand dollars ($200,000) working capital is raised by selling ten thousand shares at par and *giving away* to purchasers of same, *one, two, three or more shares of the surplus*, as may be necessary as bonus, commission &c., the balance is to be divided between ourselves and the parties interested with us in putting the Company through and pushing it to success.

And of course as the stock is *full paid*, and unassessible, we can do what seems best for the interests of the Company in giving away shares by way of bonus &c. or by selling stock for the benefit of the Company at any price that seems best and without subjecting the purchasers to any personal liability for the debts of the Company, and you explain to intending investors that they are not *subscribing* to shares of the Company but they are *buying* them out and out full paid up, and without any further liability for calls or debts of the Company.

As no salaries are paid to anyone here interested in the stock of the Company, excepting only to Mr. Pineo, and this only enough to support him in *very* modest comfort, we and our friends look for our pay "should the Company prove a success" in the surplus stock we may have been able to retain. If the Company fails, we get nothing, that is nothing but abuse, of which, by the way we seem to be receiving a fair share now "on account."

The $200,000 was not actually under-written, but could be realized at once under certain conditions. We have already placed some good blocks of stock and are placing same from day to day, in the meantime furnishing funds ourselves, relying upon being repaid in the near future by making a success of the Company.

In regard to your remarks about the people who are interested in the Tea Estate Company, we would say that we shall be pleased to have them take an interest in the matter, and think it may prove to their interest to take some shares in the Company. People interested as they are in the general welfare of Ceylon would do well to look into the matter carefully, and we would say to you, that as we wish to interest the Ceylon people of London in our Company, you may consider that you are at liberty to propose special terms as to number of shares they should have as bonus, upon buying some Treasury stock. This only applies to specially desirable people of which you must be the judges, as our policy is not to sell *any* stock except to those who will be of benefit to the *business* of the Company not solely selling out stock with the object of securing the capital required. Our plan may not act quite so quickly, but we will have a better assurance for a regular and increasing business.—We remain, yours truly,

(Signed) WATTSON & FARR.

New York, November 11th.

Hon. J. J. Grinlinton, M.L.C., Colombo, Ceylon.

Dear Sir—In accordance with the understanding with you when you were here that this Company should define its position with regard to selling pure Ceylon tea, unadulterated and unmixed, we now beg to advise you that this Company undertakes to sell only the pure and unmixed Ceylon teas—it being, of course, understood that our Ceylon and London Agents supply us with only the above articles.—Yours faithfully, for Ceylon Planters' Tea Coy., (Signed) R. E. Pineo, Secretary, for Ceylon Planters' Tea Company, (Signed) S. Ellwood May, President.

New York, November 11th.

My dear Mr. Grinlinton.—I enclose herewith a document as requested in your last letter to Messrs. Wattson & Farr. You will kindly note that my fellow-shareholders here have done me the honor to elect me—at this, the most critical time of the Company's existence—its President, which fully establishes Mr. Pineo's position as taken by him, as regards myself when he was last in Ceylon. You will no doubt remember that some of your journals criticised him at that time.

I also take this opportunity to state that the Company formed here into which the old Company is merged, has not only been carefully formulated by the Company's counsel, but that I have, individually, at different intervals employed three representative attorneys of this city to go through this whole affair and give me their opinion as to its being unquestionably fair, honorable, legal and in every sense honest to all concerned. When you take into consideration that the promoters do not, as usual, agree to put a certain amount of stock in the Treasury, but do agree to use enough stock to raise $200,000 in cash, for the Treasury, and in the interim get nothing for their labor, and are called upon to spend their own money and take many risks, you can well understand that they do not propose to permit the sort of abuse that one of your papers, without investigation or hesitating, published; although to those who are posted it is too absurd and ridiculous to injure any one. It would seem as though the press of Ceylon should have the interest of the planters at heart, and not publish something that might be copied by our enemies and the opposing interests, and thus have it appear that the situation of this company in Ceylon is as outlined in the "Times of Ceylon." Someone should make it plain to the journals of your island that our success has a very bad effect upon those who have been unsuccessful, and it arouses their petty jealousies and they are very apt to write libellous untrue statements, especially as in the case of Mr. Arthur who has left the country and cannot be made amenable to the laws.

I would also call your attention to the fact that when the promoters of this company have succeeded in raising the $200,000 in cash they then receive for their work, money expended, etc., what may be left of this paper, and must then spend years to make it pay good dividends as well for themselves as for all the other stockholders, before they get a particle of remuneration. When the planters of Ceylon thoroughly understand this whole matter we feel that they will do everything they can to aid this great undertaking which, whatever occurs to the promoters and workers here, must necessarily benefit them. I have recently called the attention of the Directors of this Company to the fact that our work here already has started up others in importing from London Ceylon Teas and selling them here. It gives me great pleasure to inform you that our plans are well received here and we are almost daily procuring new stockholders and good reliable selling agents.—I am, dear sir, yours very cordially,

(Signed) S. ELLWOOD MAY.

The Hon. J. J. Grinlinton, M.L.C., Colombo, Ceylon.

SATURDAY'S MEETING *RE* CINNAMON CHIPS.

AGREEMENT CANCELLED.

The meeting convened by Mr. Jardine for the purpose of considering whether the agreement entered into by cinnamon propriotors *re* cinnamon chips upon honour was to continue in force or to be cancelled

was held on Saturday (Dec. 13th) at 2-30 p. m. in the rooms of the Ceylon Association. Mr. W. Jardine was in the chair, and there were also present Messrs. S. R. De Fonseka, J. W. C. De Soysa, M. D. Cockburn, C. F. Fonseka and Jacob De Mel.

The CHAIRMAN said that the object with which he had convened the meeting was to enable them to decide as to whether the agreement that was signed by a large number of cinnamon proprietors should continue in force or be declared cancelled. There was a widespread feeling of suspicion and dissatisfaction abroad that a great many who had signed the agreement upon honour had not kept to their word—in fact their word of honor was to them a matter of far less value than the fow rupees they got by selling chips. He had received letters from some, and in the course of his personal communications with others, he was assured that the majority of those who signed the agreement upon honour had not kept to it. In the face of this and of the fact also that the export of chips had not decreased but was quite equal to that of other years he thought it necessary to convene this meeting so that a decision might be arrived at as to what was to be done. Mr. Tudor Rajapakse's cinnamon estates had been leased, and there was no clause in the lease to refrain from exporting chips. Since that lease he had heard that several owners of cinnamon estates had commenced to scrape chips, and only the other day he received an enquiry as to whether it was a fact that the agreement was cancelled. He had certainly expected to have seen a larger attendance of those interested in this question than were present that evening. The small attendance showed a great lack of interest in the question and it also led one to believe that very many cinnamon proprietors had determined upon the course they had intended to pursue. When the question was first mooted and the agreement was entered into there was an impression prevailing in the minds of many that quite a quarter of a million lb. would be suppressed, but in that they had been disappointed, for they saw by the returns that there was no diminution whatever. It was now a question for the meeting to decide as to what course they intended to adopt in the matter, and in conclusion he invited the meeting for an expression of their views.

Mr. S. R. DE FONSEKA rose and said he had no doubt that the meeting would agree with what had been urged by the Chairman. It was a fact that many who had signed the compact had not kept to it, and the fact of their absence from the meeting showed that they took no interest whatever in the matter and that they were determined to scrape chips, for if they did take an interest in the cinnamon trade they would use their very utmost to increase the price of the spice. He believed that all interested in the spice would be thankful to Mr. Jardine for the interest he had taken in the matter, and for his part he was sorry to find the majority of their friends not inclined to support such a laudable object. He thought now that there was no other alternative for them but to scrape chips, for it would not do well for a few cinnamon proprietors only to refrain from scraping whilst the majority of them scraped away to their heart's content.

Mr. M. D. COCKBURN followed, and said that it was quite clear to him that cinnamon chips should be placed in the same category as cassia. It was apparent to him that cinnamon chips did not go in opposition to ordinary quill bark, and that the two qualities were put to totally different purposes. This could be instanced by the range of prices at the August sales, when, notwithstanding the large exportation of cinnamon chips, the price of quill bark went up, so that it was quite clear that the chips did not at all go in opposition in the London market to the ordinary quill cinnamon. But the only quality that benefited and would benefit by the suppression of cinnamon chips was the superior quality. The price of that superior quality went up at the February sales and also at the August sales, but it only went down a trifle at the last sales. Leaving that out of consideration he saw no reason why only a portion of the proprietors should refrain from scraping chips whilst the majority had not adhered to the compact. It was quite clear that they determined not to keep to the compact, and therefore he thought the remainder should also be allowed to scrape away to their hearts' content. He therefore begged to move the following resolution, viz.:—"That in view of the widespread feeling existing that a large number of those proprietors who signed the agreement upon honor, not to scrape chips for two years, had not kept to the compact, it is considered expedient by those present at this meeting that the agreement should be cancelled."

Mr. S. R. DE FONSEKA seconded the motion, and it was carried.

A vote of thanks to the chair terminated the proceedings

CASSAVA IN FLORIDA.

(*Editor, "Louisiana Planter."*)

I see an article from a gentleman of your state on this plant, in one of our Florida papers. It is a plant in which I feel a deep interest—an interest which has no depreciation in my estimation after twenty years of cultivation and use. For stock of all kinds, in domestic use, that will eat the sweet or Irish potatoe, or any other root, nothing, I am satisfied, will compare with it for relish and nourishment; and as a feed for fowls no root can possibly equal it. In fact, the finest fowl yards imaginable can be made with the cassava plant. I have a stalk nearly three years old which has not been killed by frost, and could have had acres of such, as the frost does not kill here on my sand hill. The idea for a fowl yard is to plant an intended spot of any desired dimensions with the stalks which are used in short sticks for seed, and let it grow eight or nine months, at least, before turning in the fowls. The spreading boughs of the plant supply shade and protection from hawks, and the roots, as soon as the fowls learn where they are, will furnish half their feed. The roots usually grow at a slight angle—seldom perpendicular—and can be exposed to view by removing a little soil. If chipped a little, they are so white that the fowls will not be long in sampling them, after which they will do their own grubbing, and in doing so will get meat with their bread, as many worms and insects will be unearthed in securing the roots.

It is half feed for horses, mules, oxen, and milch cows. No beast ever showed more desire for corn or anything else than cows do for cassava roots, once accustomed to eating it; and it is the handiest thing to feed them on you could well imagine. A horse's appetite, if delicate, can be improved on it sooner than on anything else. I have made the finest bacon and lard largely on it and sweet potatoes that I have ever used. Corn and peas will do no better. It makes a fine reminder of oyster fritter if grated, seasoned well with salt and a little soda, and fried nicely. Fine pudding, custards, and bread can be made of it, and with fresh meats, as a stew, it is hard to excel when sliced thin and well cooked. No root is healthier as a diet. For starch it can hardly be excelled. As a feed simply for cattle and horses we would not on any account do without it. Florida, of course, is best adapted to this plant, except further south, but I believe the day will come when it will be found to be profitable anywhere that sugar cane will pay. I have an intended manual for farmers, yet in manuscript, on *cane*, *cassava*, *peas*, and *sweet potatoes*, which, if I were able to get into print, would give all the instruction on cassava that need to be known in all its cardinal features. I wish some pretty fellow would take pity on me and print a few thousand copies of it; possibly he and I, too, would clear expenses on it, and somebody else make a profit growing crops by its instruction. As to the yield of a cassava crop planted correctly and fertilized highly, it is something incredible. A gentleman in this county grew one root which weighed something over fifty pounds at about one year from planting the seed stalk. On a calculation of fifty pounds to the hill, each occupying a square of four feet, which gives 2,705 hills per acre, I get 135,250 pounds, which gives a fraction over sixty-seven and one-half tons per acre,

One cent per pound is what I have always sold the root for in the market, which would figure up the handsome sum of $1,352·25 per acre. But let us reduce it sufficiently in price and production to figure but one-fourth in dollars and cents, and we have left yet $338·06¼. This would, of course, be an extravagant reduction and could not fairly be allowed. But, extravagant as it may appear, I am soundly convinced of the fact that every acre a man can cultivate, which he has stock, fowls, and folks enough on the farm to consume, will yield him a profit por acre of $500 annually, while $50 for fertilizer and expense for the cultivation per acre will fully meet all the cost.

Midland, Polk County, Fla. S. W. CARSON.

CASAVE OR YUCA IN CUBA.

In a recent number of the *Planter* there is what appears to be an error copied from an exchange, which although perhaps of no great importance, should not pass unnoticed, for however trivial an error may be, it is always worthy of correction, and more so when it promises to become general. I refer to the manner in which the word *casave* is misspelt and misapplied. It has legitimately no direct reference to the plant I presume it is meant to designate, nor to its root, and it would be quite as proper to call wheat by the name of bread. Casave is an Indian name adopted by the Spaniards and means simply a kind of cake made from the root to which the word is being erroneously applied. The plant and its tuber are both called yuca in Spanish, (pronounced you ka, with the accent upon the first syllable,) and it has the same aboriginal origin as the misnomer. Throughout the British West Indies I believe both plant and root are universally called *manioc*, and to avoid confusion it would perhaps be well to adopt the same name in the United States, although the Spanish word is more concise, more euphoneous, and has the right of priority. Yuca was one of the four or five plants cultivated by the Indians of Cuba when the ill-requited Columbus discovered the new world, and strange to say, it was cultivated by these savages with far greater recognition of its requirements than is shown by their more civilized successors. This is abundantly evinced by the detailed description left us by one of the quaint authors of those primitive eventful days, and I regret not having the account at hand to enter more fully upon the subject. The aborigines made their casave by first taking off the outer and inner skin from the roots, rasping or pounding them to a paste almost, and spreading this in a thin layer upon a smooth flat stone previously heated, producing thus a sort of large, round wafer which could be kept a long time and enabling them to undertake long journeys, without preparing food upon the way. Casave eaten with honey seems to have been the staff of life of these inoffensive Indians, fit denizens of a land that harbored no wild beast nor venomous reptile, (not human,) and where even the honey bee had no sting, and can only defend itself by a square rough and tumble fight, which the unfortunate aborigine, more stingless yet, was too meek to attempt with his merciless invaders. The Indian, it is said, was long ago "improved off of the face of the earth," but the little Cuban bee still holds its own, bravely defending its home in the forest trees, its diminutive single entrance with a restless sentinel always in the breach, stopping the way against its imported adversary.

Casave, although in all probability very nutritious, can hardly be considered a delicacy, and the taste for it is apparently an acquired one: it is, however, still common in Cuba and often sold about the streets.

There are several varieties of yuca in which the root differs greatly, some of them indigenous and others probably imported. One called here the sour, or *agria*, is said to be the root from which the Indians in some of the islands manufacture poison for their arrows, but this seems at least doubtful. The leaf of the plant has a unique shape, and a yuca "patch" when about half grown is a pleasant sight. In this stage the lower leaves still reach the ground, the foliage forming a hemispherical mass, making rows of verdant domes, which are generally very regular and symmetrical in form. Where not exposed to frosts the plants may be left growing for several years, and the crop kept in the ground instead of being stored, with the further advantage of increasing all the while, but during the wet season the roots become watery and less palatable. One variety is quite bitter until about a year old, when it loses its unsavory flavor and preserves its edible qualities better in wet weather than other sorts. The yuca should undoubtedly be grown as a regular crop in the United States wherever the climate permits, for it is an excellent tuber, better probably, more productive and nutritious than the potato, resembling it in many of its other qualities. It is a good food for all animals, including man, and in Florida, or at least in the southern part, where it can be kept in the ground throughout the winter, it might be made the basis of a large industry in the manufacture of starch, of which it yields about 2 per cent, superior in quality to that in common use. Yuca starch resembles arrowroot very much, and, I believe, can only be distinguished from it in the form of the grain and by microscopic test, and may be used for the same purposes.

The process of extracting starch from yuca is very simple, and the requisite machinery, although differing from that generally used in the manufacture of the commoner kind, is neither complex or expensive. Starch might be made in Florida from this source upon as large a scale as sugar; also "British gum," which this root yields, I believe, by the simple addition of a due proportion of sulphuric acid, for no decoloration is needed. Yuca starch, if well washed, is undoubtedly superior for any purpose, and would meet, when its qualities are known, with a more ready sale at a higher price than the product of wheat and potatoes.

If any of your readers in that state wish to do so they can test this new industry in a small way at very little trouble or expense. The roots should be at least a very old, and from some varieties the yield will be greater after the second year's growth. They should be well washed and the two skins removed, particularly the outer one, for otherwise its finer particles will get mixed with the starch and are not easily separated. The roots may then be rasped or grated into a tub with a common hand grater made of punched tin, and for convenience of large size. To effect this operation on a large scale, a rasper may be made by securing sheets of punched tin upon two wheels made of board, and secured upon a wooden axle about five or six inches apart, to be turned by a crank while the roots are pressed endwise against the surface, in an inclined box of the same width as the rasper. The grated mass should be mixed with water and strained through a cloth fine enough to intercept all the particles of fibre. The residue may be washed until it has yielded all its starch and the refuse fed to the pigs. The starch will soon settle to the bottom of the vessel in which the liquid is placed, and then the water should be drained off. This should not be deferred too long, because a yellow deposit will then be found upon the surface of the starch, which must be washed away at some loss, although this will not be very great, for the mass is firm and compact. The starch should be again mixed with water, (before it sours, as it will if left too long,) strained and settled anew, in order to purify it. After this it has only to be spread in the sun to dry. If the yuca is of good quality, the product obtained will be a fine, white powder, which will go much further than the common article. Any farmer may in this way supply his family for a year with little labor.

The cultivation of yuca is simple and requires no seed but the stalk, which, when dry, will also furnish fuel. It should be planted in rows about six feet apart and some appropriate crop sown between. The plant requires little moisture, and any excess if long continued is very pernicious. It should, therefore, be put into the ground toward the end of the rainy season, in order to give it a fair start before the winter droughts commence, and it is better to bank the land

into ridges before planting, for the double purpose of securing good drainage and a sufficient depth of loose soil for the free development of the roots.—SANTIAGO DOD.—*Louisiana Planter.*

ORANGE CULTIVATION:—THE SATSUMA.

Not many years back, any orange was simply an orange, with but one main distinction of variety, given as to whether it came from Messina or from Havana. Then the Havana oranges, regardless of size, shape, color or quality, were the top notch, and supplied the desires of those wanting the best.

The opening of orange culture on a commercial scale in our own Florida has changed all this, and practically driven the foreign fruit out of the market, save as poor crops at home or especial cheapness give it entrance. And our orange lovers have learned to distinguish, even in the North, between the many varieties received from Florida, and frequently between the same variety grown in different localities in the flowery state.

The writer well remembers his first acquaintance with one very distinct orange, the Mandarin type, which, from an abundant crop, strayed into the interior Pennsylvania markets a few years ago. The peculiar flattened shape attracted the eye, and a closer examination established the little fruit firmly in the favor of many who then first obtained it. The varieties of the species to which all of this type belong (*Citrus Aurantium nobilis*) are many, and much superior to the original form which pleased us. All possess the peculiarity of a loose skin, readily removed without breaking the skin of the interior segments.

The Satsuma—also called Oonshiu. Kii Seedless, etc.—is probably the highest development of the Mandarin type. It is a pretty orange of the flattened shape of the class, but with a rougher skin than either the Mandarin or Tangierine. This skin is a reddish orange in color, and of peculiar leathery texture. The segments are but loosely adherent, so that the orange is readily eaten out of hand without spilling the juice; this, however, is characteristic of the species, as is also the peculiar looseness of the skin, which has caused these varieties to be called "kid glove" oranges in the market, from the facility with which the skin is removed. The impression that a good orange cannot be enjoyed gracefully will not be verified in the case of this type; the small, delicate segments can be separated and eaten without in the least soiling the hands or face. It is practically seedless; some specimens have one or two small seeds. Being without the rank and somewhat "fishy" odor of the type, it does not offend the nostrils, while it surely tickles the palate; the flavor is something surprising. I have frequently handed sections of a Satsuma, without comment, to friends not acquainted with it, waiting in silence the exclamation, sure to come: "Why it tastes like a cherry!" Sometimes the impression was that of a strawberry flavor, and I have noted two or three entirely distinct bouquets, if they may be so called, in the same fruit. To most people this orange is delicious, and other varieties, however good, lose their desirability in comparison with it.

The Satsuma is said to have been introduced into Florida about 1880 by Mrs. General Van Valkenburgh, who brought it from the island of Kiusiu, one of the Japanese group. Since, it has also been introduced by way of California, under its Japanese name—Oonshiu or Unshiu. There is no difference, although many claims have been made as to the superiority of the California sort. A critical comparison of the fruit of each shows them to be identical. It is another one of the many excellent things which our Japanese friends are discovering to us, and for which we should be grateful to the "Yankees of the East."

The tree is rather dwarf, and reclinate in habit, the branches drooping to the ground, resembling somewhat a Kilmarnock willow in this respect. It is entirely thornless, and marvellously productive—a tree planted but four years on the grounds of R. D. Hoyt, at Bay View, Florida, had on it 625 fruits early in December. This tree, which is illustrated herewith from a photograph, was $4\frac{1}{2}$ feet high, and about 7 feet through. This dwarf habit renders the fruit easy to gather, and the tree is exceedingly handsome and attractive in appearance, as may be imagined.

A remarkable feature of the Satsuma when budded on *Citrus trifoliata* stock is its hardiness, which is yet an unknown quantity, as none have ever succumbed, even where the ground has been frozen several inches deep. It is suggested that it may introduce profitable orange culture into Texas; trees of Satsuma set there several years ago have done remarkably well. Indeed, it is possible that in a sheltered spot the variety may be hardy as far north as Delaware, and by acclimation come yet more into the so-far-forbidden land for orange culture; who knows! With a hardy stock and a still hardier bud, the elements are certainly favorable for an extensive widening of the "orange belt."

The commercial importance of the Satsuma cannot be overestimated. The past winter one nurseryman disposed of his crop at $9 per box, wholesale, in New York, and the demand is certainly limited only by the supply, as the peculiar features of the fruit create a taste for it in any one favorably impressed at first, even where there is a dislike for the original Mandarin type. The expense of growing a crop must be less than for other varieties, so that even when the vastly increased production reduces prices, there will still be a profitable margin. The variety keeps fairly well, and packs very attractively, owing to its peculiar skin.

There has been extensive planting of budded Satsumas in Florida in the last two or three years, particularly since the trees have been offered by nurserymen at reasonable prices. A large production of the fruit may therefore be expected in the next few years, when all the country will have a chance to become acquainted with this fine variety.

Owing to the dwarf habit of the Satsuma it is admirably adapted to pot culture; moderate sized plants grown for two years only in greenhouses in Virginia have produced 40 to 60 fruits each, and make a very handsome display when set with the odly shaped oranges. Indeed, there can be but little question that this is one of the most valuable introductions of many years among citrus fruits.

J. HORACE MCFARLAND.

—*Farmer and Fruit Grower.*

VIRTUES OF THE PAPAW.

(*Editor, "Farmer and Fruit Grower."*)

It is probable that many people who have read of the singular qualities of the tropic papaw dismissed the subject as entirely too fanciful for serious attention. So I at first regarded the claim that a tough beef steak, wrapped in the bruised leaves of the papaw for a few hours, would become tender. However, after much delay, I decided to try if the fruit would not assist digestion, a reasonable deduction if the fruit or leaf would digest tough beef out of the stomach. I soon found the fruit a perfect remedy for indigestion. I made many inquiries but found nobody among the old settlers in Manatee and DoSoto counties who had heard such a claim for the papaw before. But at Fort Myers, Lee county, I found nearly all the old residents knew of it valuable properties. A doubt with me arose that if so potent might it not be dangerous in some way. But the necessity for a remedy for indigestion led to some months use of the fruit for that purpose (and I must say they are very agreeable "medicine"), and instead of any ill effects or necessity for their continued use as I fancied might result, they seem to have nearly, if not entirely, cured the chronic indigestion from which I have suffered for seven or eight years, and which grew worse, very perceptibly, each year, though good physicians were consulted and their remedies tried, with no permanent improvement. This sounds like a patent medicine certificate, but I do not see how I can draw attention to so important a matter in a better way. I wish to induce people to plant at least half a dozen of the trees for each case of in-

digestion and cure themselves. North of Fort Myers the plants or trees will need some protection from very hard frosts. But I have seen plants with half a bushel of fine fruit when not over four feet high, and not, I think, quite two years old. Such plants or trees can easily be protected in any part of Florida. The seed must be planted very shallow, barely hidden with the soil, and the plant set out when about one foot high. Where the soil is rich and the trees are to be protected from frost, they may be set as near as four feet apart, but more room would be better. I cannot learn how high they might grow eventually, the highest at Fort Myers being near twenty feet. Should they grow beyond any practicable covering, new plants might be started to take the place of those that get killed by passing out of shelter. For indigestion eat as much of the fruit at supper as you wish. It being better, where fruit is scarce, to make its use as near continuous as possible. The green fruit seems as effective (or more so), for indigestion as the ripe. The taste is much like that of the musk-melon. They are also called melon-papaws, and are, when ripe, from the size of a large hen's egg to that of a half-gallon measure. I am told that very differently shaped fruit grow from the seed of a single tree. Some of the trees have no branches, while others have from one to a dozen. Some writers say they have no branches, but many do. The tree is quite novel and ornamental; well worth all trouble of propagation as a novelty, or as a fruit, or a medicine, or to make tough beef tender. A South Florida party proposes to use them in canning Florida beef for market. I have not a seed or plant to spare at present. Almost anyone at Fort Myers could procure seed if called on for them and postage sent, or I will send seed in a month or two if anyone desires to test the matter. W. E. DRISCOLL.

Manatee, Fla., June 16, 1890.

INDIAN EXPORTS.—For the first six months of the current commercial year, namely, April to September 1890 inclusive, the export of certain staples in which we are interested, have compared with past years as follows:—

Export for first six months of three seasons:

		1888.	1889.	1890.
COFFEE ...	... cwt.	210,814	80,540	113,203
TEA ...	... lb.	42,326,269	44,301,931	44,309,341
CARDAMOMS	... lb.	109,978	77,024	51,307
PEPPER ...	... lb.	3,824,526	3,079,543	4,850,405
CINCHONA BARK	... lb.	646,022	263,133	401,628
COCONUT OIL	...gals.	775,437	792,747	387,851
CAOUTCHOUC	... cwt.	6,057	7,060	6,065

In Cinchona Bark, coffee and cardamoms, India is not making progress, while coconut oil has fallen very low this year in exports.

THE EFFECT ON PLANT-LIFE OF GROWTH AT HIGH ELEVATIONS.—From a communication on this subject by M. Gaston Bonnier, detailed in the *Comptes Rendus* for September, we extract the following results of comparative researches in experimental physiology made by that gentleman. Experiments made on two exactly similar plants, subjected to the same external conditions, showed that the functions in a specimen cultivated in an alpine climate are so modified that the amount of feeding-power as represented by assimilation and chlorophyllic transpiration is increased; while in a plant grown in darkness, respiration and transpiration seemed slightly modified or even diminished. Therefore, we may conclude, that during the short season at high altitudes, plants elaborate more freely the nutritive principles which are necessary to them than do corresponding plants of the same species at lower elevations. These experiments serve to explain the presence of the larger relative quantity of sugar, starches, essential oils, colouring matter, alkaloids, &c., which are found in plants native to a low elevation, when these are grown in an alpine climate, as all these products are directly dependent upon chlorophyllic assimilation, that is to say, on the greater vigour and sound health and nutritive power shown by the plants when at a high elevation.—*Gardeners' Chronicle.*

WESTLAND'S PATENT TEA-BREAKING AND SIFTING MACHINE is doing very good work, we are glad to learn, and there is considerable differences for the better between the teas turned out from it, and those of the different grades sifted by ordinary sieves.

BONE MANURE.—Professor S. Cooke, of the Poona College of Science, has patented a process for the manufacture of artificial manure from bones with the aid of raw materials found in every Indian village, and he has, moreover, proved its efficiency by practical experiments conducted on his own farms at Panchgani and elsewhere.—*Madras Times*, Dec. 18th.

VEGETABLE BUTTER.—A new artificial butter has made its appearance on the French market, which has already been heard of and, it is said, will be introduced in England. It is made from coconut oil, purified with alcohol and bone-black. The washing with alcohol removes the unpleasant aromatic principles and all tendency to rancidity. The washings are used for making artificial flavouring essences employed for liqueurs and confectionery. As the usual tests for margarine fail with the new counterfeit butter, analytical chemists are devising methods for identifying coco-butter (not cacao-butter) and cow-butter "cocotised."—*Chemist and Druggist.*

NORTH CACHAR, Nov. 22nd.—Gardens are shutting up very fast indeed. A little rain now would be a godsend, and would carry us on into December, but as it is, the quantity of leaf from teelas and in fact off all plants save indigenous, is almost nominal. Just starting the cold weather deep hoeing—turning up the ground in fine big lumps. Kitchen gardens are coming on, and there will be lots of English vegetables presently.—What a treat! Weather exquisite and all the more enjoyable after the awful past season. Not the least prospect of any rain. River steamer service apparently made up its mind to tread on the British planters' tail as often and as hard possible, and neither to beware or have a care. But *nous verrons.*

UTILIZATION OF BONES FOR MANURE IN BOMBAY.—There are 7 bone mills in Bombay and 1 at Thána. The latter is a large one, recently opened by Messrs. Croft & Wells. Bones are brought by itinerant dealers chiefly Musulmans, who employ the low-castes of villagers to collect them. These petty dealers either sell direct to exporters, who employ the Bombay mills, or to larger dealers. It is estimated that some 10,000 tons are annually collected. The prices paid in Bombay vary from R35 to 45 per ton, but are rising. Conversion to one-inch bones costs about R2½ and to bone meal about R5. The prevalent prices last season in England for the prepared bones were £4-10 and £5 respectively. The imports by sea of bones to Bombay for export to England come chiefly from Cutch and Kathiawar. The rail imports are larger. The difficulty of collection in the Konkan has so far prevented much export therefrom.—*Madras Times.*

MM. FREMY AND VERNEUIL have presented another paper to the Académie des Sciences, Paris, on an improved method of manufacturing rubies. Instead of employing pure alumina, they now use chromated alumina, alkalised with carbonate of potash, which does not impair the purity of the crystals, while facilitating their formation and enhancing the beauty of their colour. Other improvements have been introduced, especially in lengthening the time of the reaction to a week or more, thus engendering hard, rhombohedral crystals of a large size. A gas furnace is used in place of a coke one, and thus a constant temperature of 1,300dg. C. can be maintained for weeks. Large crucibles, giving more than three kilogrammes of rubies at one operation, are now adopted. MM. Apport, the well-known glass-blowers, have allowed the investigators to make use of their furnaces and they have thus been able to prepare rubies which are in part sapphires, or crystals, red on one side and blue on the other, a phenomenon sometimes found in nature. The same charge will also produce crystals entirely red, and others wholly blue, perhaps owing to a difference in the oxidation of the chromium.—*Globe.*

GEM WASHING PLANT.

It has been pointed out to us that *Engineering* of April 25th last contained an account of "Diamond Washing Plant," with a series of engravings which afford a very good idea of the machinery employed in excavating, transferring and washing the clay deposit in which diamonds are found and which doubtless afford some idea of the kind of machinery now being sent out by the Ceylon Syndicate to be used at Rakwana. The illustrations show the Diamond Washing Plant for the Bulfontein, Kimberley and De Beer's mines, and they certainly show the elaborate nature of the machinery. From the letter-press we quote as follows:—

The whole machinery is erected on a high bank of tailings, levelled for the purpose and connected by an inclined tramway with the depositing floors below, on which the blue ground brought from the mine is caused to pulverise. The trucks containing the pulverised ground are hauled up this incline by an endless chain driven by intermediate gear from the same engine which drives the rest of the machinery. Arriving on the level bank, these trucks run along the tramway P and are tipped into the inclined screen A, through which the fine ground passes into the feeding hopper of the dry elevator B, whilst any lumps or stones too large to pass the screen are returned along the tramway Q for further exposure on the depositing floor. The fine ground lifted by the dry elevator is equally distributed between the two revolving screens U U, which are slightly inclined, so that any lumps too coarse to pass the mesh pass out at the ends of the screens, and are similarly returned to the depositing floor along the tramway S. The screens are generally formed of stout square steel wire, woven into a mesh with ¾ in. openings. This is in Bultfontein Mine, where the average size of diamonds is smaller than in the other mines. In Kimberley and De Beer's mines the mesh is generally 1 in. square. A spray of clean water is kept playing on the outside of the revolving screens, and a certain quantity is also fed into the hoppers of the screens where it meets the dry ground from the elevator, so that what passes the mesh of the screens is in the form of a puddle and is ready for treatment in the rotary machines E E into which it directly runs. These machines are each 14 ft. in diameter, being formed like mortar mills with an inner and an outer rim, the latter about 18 in. high, the former about 9 in. In the centre of the machine is a stout upright shaft resting on footstep bearing, and to this shaft by suitable attachments are secured eight radial arms extending so as almost to touch the outer rim of the machine. Each radial arm carries five or six vertical steel tines which are set to within about ½ in. of the bottom of the machine. The inlet for the puddle is by an inclined shoot from the apron under the screen discharging through the outer rim of the machine, whilst the outlet is over a weir cut in the inner rim. Since the effect of the revolving knives is to throw everything towards the outer rim, it follows that all the heavier particles tend in that direction, whilst only the light refuse passes over the central weir. The speed of the machines is about nine revolutions per minute. As it occasionally happens through careless feeding, or other causes, that diamonds are carried over the central weir, the second pair of machines, or safety pans F F, which are an exact duplicate of the pans E E, receive all the tailings from the latter, and treat them over again before they pass through the overflow of the safety pans to the wet elevators W W, which deliver them on to the spoil bank. At the top of each of these elevators are inclined screens which separate the coarse mud from the muddy water, the latter being returned down the shoots V V to the feeding hopper of the revolving screens, where it mixes with the clean water, and forms a puddle of proper consistency, a matter of the greatest importance as if the water is too clean light stones accumulate in the machines, raising the level of the deposit therein, whilst if the water is too muddy heavy stones may flow away in it, and in either case diamonds are liable to be carried over the weir.

In this connection, and as showing the great necessity for the introduction of machinery into our gemming districts, we may mention that the splendid catseye recently bought by a Moorman and valued at many thousand rupees, is supposed, for good reasons, to have been picked up by a workman of the Akuressa Syndicate, who, of course, bolted with it, leaving his balance of pay unclaimed. The announcement that a large catseye was in the market followed a few days after the disappearance of the workman referred to!

THE DUTCH BARK MARKET.

AMSTERDAM, Nov. 26th.—Cinchona.—The sales to be held in Amsterdam on Dec. 11th will consist of 4,536 bales and 135 cases (about 388 tons) Java bark, divided as follows:—From Government plantations, 521 bales, 48 cases about 50 tons; from private plantations, 4,015 bales, 87 cases, about 338 tons. Druggists' bark Succirubra quills, 135 cases; broken quills, and chips, 427 bales; root, 77 bales; officinalis, broken quills, chips, 62 bales; Ledgeriana, broken quills and chips, 2,725 bales; root, 996 bales; hybrids, broken quills and chips, 164 bales; root, 85 bales. Total, 4,536 bales, 135 cases.—*Chemist and Druggist.*

CEYLON UPCOUNTRY PLANTING REPORT.

PRIZE ESSAYS ON THE FERMENTATION OF CACAO—THE WISDOM OF THE WEST INDIES—BUTTERED CACAO—INGENUITY OF THE MOORMAN—HOW TO INCREASE THE WEIGHT OF CACAO—ADULTERATION.

Dec. 17th.

The Ceylon grower of cacao will receive a new sensation if he gets the December number of the *Tropical Agriculturist*, and reads the "Prize Essays on the Fermentation of Cocoa," taken over from the Trinidad *Agricultural Record*.

In Ceylon we too have had at times a rage for Prize essays; but anything that ever issued here could not be compared for a moment with this batch of practical beauties, which represent the wisdom of the West Indies. They are the nearest things as oracular and pretentious deliverances, to the lectures which the tea experts used to confound us with in the past, and which we all regarded with becoming awe. When I was done with the reading of these West Indian essays, and had noted the diversity of opinion which existed on the commonest matters of cacao curing, and how every man seems to do that which is right in his own eyes, and becomes an authority in consequence, I could understand how it was that a Commissioner was not sent here to learn our method, so that on his return he might establish some kind of principle among them. As it is they have methods which run from three hours to fifteen days; and the unfortunate who goes to these papers for practical guidance will be at his wits' end as to what course to follow. What these West Indian planters are suffering from is a plethora of knowledge, and the crying want among them is how they can best unlearn.

They are nothing if not scientific. Read a passage like this:—"The vinous fermentation in this vat (No. 1) induced by 'saccharomyces cerviciæ' is accompanied before removal probably by a commencing lactous fermentation, the ferment of which is 'penicillium glaucum

$$C_2\ H_{12}\ O_6=2C_2\ H_6\ O_3$$"

This is decidedly high feeding, and there is more or less of it in all the essays.

It is hardly to be wondered at that a class of men who are capable of producing the above and understanding it have many trade secrets in connection with cacao curing. "Talisman," the *nom de plume* of one of the writers, surely carries off the

palm in his butter dodge, which is as ingenious as it is original. "On the morning of the sixth day," he says, "get some good quality of butter, wash out all the salt thoroughly, and rub the cacao with it. About three cents worth of butter is sufficient to each bag: the butter will give the cocoa an agreeable perfume without destroying the chocolate aroma, and will prevent mildew, one of the greatest enemies that cocoa planters and shippers have to contend against."

There is an appendix to this essay, and "Talisman" has a note on bittered cacao. He feels that this plan of his may not commend itself to the common intelligence, be received with derision, in fact, and like the Roman who appealed unto Cæsar, he appeals unto science. "The application of butter to cocoa &c. may excite the risibility of some people," he says, "but I have tested it well: and cocoa which has had butter judiciously rubbed on, can be shipped without fear of mildew to any cold or damp climate. The milk of the cow must have some latent virtues antagonistic to the little germs or microbes which infest damp cocoa."

In manipulating cacao, and doctoring it for the market, the Moorman has always been considered to be an expert. He discovered the use of the annatto dye for brightening up a dark sample, and now that this little dodge has been found out, and local buyers are in a position to checkmate it; his active mind has been at work again, and the same results which the annatto formerly produced, he can and does bring about by jak sawdust and lime. When this the latest plan is tripped up, he will devise something else. This kind of ingenuity, which is so marked a feature of the Moorman mind, has rather a deteriorating effect upon character, and has earned for the Lebbes and Saibos the reputation of sharp practitioners.

But as compared with our West Indian rivals the Moorman is nowhere; and he has but to transfer himself to Trinidad, or Grenada, to have his character renewed, and receive a moral whitewashing. What the Moorman does in the closet, the West Indian cacao planter unblushing carries out on the housetop. For example, the essay which received the first prize has the following passage, showing how weight of cacao may be increased, and colour heightened:—"The husk is certainly much more brittle in washed cacao, and does not therefore protect the bean as it should: it weighs also considerably lighter, but this might be made up by *recoating* the bean with a mixture of starch, gum tragacanth, and boric acid. This would be preservative, and improve the look of the cocoa very much: colour might be added if desired. If so it should be *red earth,* and not common colouring material, because earth coating is recognized as legitimate." Legitimate! who in the world recognizes red earth as a substitute for cacao? Just fancy a state of things where the above adulterations are current and advocated! The Moorman would starve among them, he would find his occupation gone.

It is pleasing to find one of the essayists protesting against the adulterations current, and pointing out what the result would be.

We know how the "Heathen Chinee" mixed his teas with all kinds of abominations, and how he has been driven out before the pure article which is produced in Ceylon and India. Ceylon cacao too has the highest place in the world's market; and while, doubtless, this is greatly brought about by our being in possession of the Caraccas variety, that it is pure like our teas, must also have an effect, for doctored cacao, like doctored goods generally, don't pay.

There is a great deal more in these essays that might be written on. But enough; let those who would learn more of cacao curing in the West Indies betake themselves to the *Tropical Agriculturist.*

PEPPERCORN.

KEROSENE as a therapeutic agent is highly spoken of by Dr. H. A. Gross in the *Medical World.* It cures almost all pains, from toothache to gout and rheumatism. It is deodorized in this manner: Take of coal oil, 1 pint; nitric acid, 1 ounce. Let it stand for a week and pour off the supernatant oil. It does not in the least smell like coal oil.—*Sugar-Bowl and Farm Journal.*

SALE OF ESTATES.

We learn that Agra-oya estate, in the Lower Dikoya district, has just been sold on a cash offer, the terms of which have not yet transpired. A well-known estate in North-East Matale with a small area of tea is also about to change hands:—the sales in both cases will mean fresh capital and fresh blood.

The Fiscal's sale of Hyndford estate, Nawalapitiya, —which is likely to become a very valuable tea property by-and-by—has been delayed for the present.

SAMBAS R WEST BORNEO, AND GOLD FINDING.

(*From a Correspondent.*)

As I see a notice in a late number of the *Observer* of the map of Sambas (west division of Borneo), it strikes me that perhaps you might like to have a translation of the account of Sambas to which the map was attached. "Bij dit artikel behoort een kaart" is the note under the heading of the leading article in the *Indische Mercuur* of 1st November last. It consists of a short but clear account of the present state of this portion of Netherlands India and a sketch of its history from the first setlement of the Dutch there in 1609 when the East India Company entered into a treaty with the Sultan of Sambas up to the presnt time. On my way to Java I met the then Assistant Resident of Sambas (it was then only an Assistant Residency), and we were fellow-passengers to Batavia on board a Dutch schooner, the "Katerina Kornelia," belonging to McLean, Watson & Co. and called after Mrs. McLean. Mr. Gibson formerly of Ceylon who married one of Colonel Watson's daughters was in Sambas a short time ago, and to the best of my belief he is there now. If this account of Sambas, with its description of the manner of collecting gold, will be of any use, I will send translation. [By all means send it to be given in *Tropical Agriculturist.*—ED. *T. A.*]

PLANTING NOTES.

MANA GRASS EXPERIMENTS AND STANLEY-WRIGHTSON TEA CHESTS; MR. ROGIVUE AND CEYLON TEA IN RUSSIA.

LONDON, Nov. 28.

At length there appears to be almost a certainty that the perplexing doubts respecting the several experiments made here with mana grass from Ceylon will be satisfactorily cleared up. We hear that the gentlemen who sent home the fourteen hundredweights of this grass, the failure of trials made with which my letters reported, has written home expressing the opinion that very probably the failure of his shipment to the Stanley-Wrightson Syndicate has been due to the fact that he had carefully removed all the stalks before making it. Of course, it is the stalk which contains the strong and long fibres; the leaf fibres only serve to mat the former under treatment. The two small lots with which the minor laboratory experiments were made with such success contained all the stalk of the grass. It is no wonder that Dr. Evans, the analyst employed, said he could not recognize the large consignment as identical in character with that he had at first had under his hands. A small lot of the stalk is to be sent home for distinct experimenting, and the Syndicate entertains no doubt that Messrs. Curtis & Harvey will give them a sufficiency of the one ton of the grass they are expecting to continue further trials with. You will understand that it would have been just as easy to make straw paper with the ears and leaf only of wheat, as to make mana paper from the blades of mana grass alone. It may be hoped, therefore, that ere very long it

may be possible for me to send you reports fully conclusive as to the future of the maua board industry which we hope to see commenced among you.

Just as this pleasing solution of its puzzling difficulty has reached the Stanley-Wrightson Syndicate, it has been in receipt of further most satisfactory testimony as to the efficiency of its tea chests lately arrived and now arriving home with tea from Ceylon and India. There has been shown to me this week a letter from Mr. Rutherford which informed the Syndicate that the tea belonging to the Ceylon Tea Plantations Company—a lot from far-famed Mariawatte—which had been received at home in its special chests, had sold this week for 10½d at the auction as against 10d for similar tea from the same estate which had come home in wooden chests. If such a result could always be relied upon, there would be no need to consider the extra cost of the patent chests in comparison with those of wood. This important testimony by no means stands alone, as other recipients have written that the tea reaching them has arrived in splendid condition in the Syndicate chests. You will see that from both the above-mentioned circumstances, the prospect before the new tea boxes is brightening materially. A few improvements in the details of putting the chests together is all that seems to be now wanted to insure a really brilliant success.

Nothing seems to have been heard of Mr. Rogivue since he started again for the Continent and Russia. Doubtless he is by this time once more in St. Petersburg, and our sympathies are fully with him in his endeavour to secure co-operation with the Russian Minister who has taken the initiative in official action respecting the introduction of Ceylon tea. During the present week I met an old friend just home on a brief holiday from Shanghai, and on my asking him how he was getting on with his trade in China, he said :—" Last year was something too awful; but this year we are doing a really good trade." On my asking him how that could be with the English market for China tea so depressed, he remarked:—" We don't want the London market in the least ; Russia is taking every bit of the good tea we can send her and at good prices." When told by me of Mr. Rogivue's Mission, and of the recently reported action of the Russian Minister, my friend seemed to be considerably taken aback. After a few minutes of thought—evidently not pleasant thought—he observed:—" I don't believe the Russians will ever take to drinking the teas either of India or Ceylon. They can never suit the Russian palate, nor, even if they could do so, will the Russian system of making the infusion in samodvars, admit of either of those two powerful teas being used. I predict a Russian would at once spit out any Indian or Ceylon tea so infused." My answering remark was that time alone could show; but that at all events the arrangements sought for by the Russian official indicated a want of satisfaction with their present supply of China tea. On this my friend remarked that he should go to St. Petersburg himself, and see what was going on. He had evidently taken the alarm, in spite of his protestation that the growths of Ceylon and India could never prove acceptable to the Russian people.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

London, Nov. 27th.

CINCHONA.—Nearly 200 bales of Guayaquil bark were included in today's salos, and a considerable proportion of this sold, with fair competition at steady rates : Fine thin quill 1s 5d ; good stout short and mossy 1s 1d to 1s 3d ; mossy chips, mixed with quill 9½d to 11½d ; ordinary rusty and damaged, from 9d down to 3d per lb. Several lots of Loxa also found roady buyers : Good bright quilly 1s 7d ; fair brokon ditto 1s 5d ; small and broken 9d to 11d ; very mouldy and dull, from 2½d to 3d per lb. Of South American Flat Calisaya, 78 bales bright, but rather small were bought in. For the sound bark 1s 6d per lb is wanted, and an offer of 1s por lb was not entertained. There were also 16 bales (2,085 lb) cinchona from the West Coast of Africa (St. Thomas), in fairly good druggists' quills of a Calisaya character ; the best lot of this sold at 7½d per lb. For 5 cases very fine strong bold Java druggists' quill (Succirubra) 8½d was refused, though 9d would be acceptod, while 38 cases good short East Indian druggists quill were bought in at the nominal price of 1s per lb.

CINNAMON.—At the quarterly auctions which took place on November 24th about 3,000 bales were placed in sale. The market was quite flat, and only about 925 bales found purchasers, at a decline of fully 1d per lb on good cinnamon, and from ½d to 1d per lb on ordinary grades.

ESSENTIAL OIL.—At today's auctions 20 cases Citronella in tins sold at ¾d to 13-16ths d per oz and 4 cases of Winter's Lemon grass oil were bought in at 2¾d per oz.

QUININE.—Prices have been easier this week, and we hear of sales of about 40,000 oz. of German bulk quinine on the spot at 11½d to 11¾d per oz.; while the Brunswick agent is said to have sold 25,000 oz. for April-March delivery at 12d per oz., but has now no more available at that price. The other German agents quote 1s 1d per oz. as the lowest price.

CROPS IN INDIA

SEASON TELEGRAM TO THE GOVERNMENT OF INDIA, REVENUE AND AGRICULTURAL DEPARTMENT, CALCUTTA.

Week ending 29th November.—Rainfall *nil* in Northern and Ceded Districts, Kurnool and South Canara ; good in Tanjore and South Arcot ; elsewhere very slight. Standing crops generally good except in parts of Nellore, Cuddapah, North Arcot, Chingleput, South Arcot, Tinnevelly and Malabar, where they are withering. Coffee affected by leaf disease in Nilgiris. Want of rain greatly felt in North Arcot, Chingleput and Tinnevelly. Locusts appeared in parts of the Ceded Districts, North Arcot, Nellore and Chingleput, but very little damage reported. Outturn of grains generally middling to average. Prices rising in eleven districts, falling in nine.

THE CRY OF THE CEYLON CACAO PLANTER.

How long shall we suffer supinely
And bear the diurnal disgrace,
Controlling our passions divinely
And wearing a smile on our face ?
Shall we palter with procrastination,
Obeying Humility 's rules,
And suppressing our just indignation,
Be set down as—fools ?

Is it right we should wait any longer
In hopes we have suffered the worst ?
Think justice will prove herself stronger
Before we are utterly curst ?
Can we hope for decreased degradation
While decently docile and dumb,
When there settles on every plantation
This criminal scum ?

Shall we hope with intelligent natives
That Honesty soon shall o'erspread
The people : the code legislative's
Penalties all become dead ?
May we trust that the deep concentration
Of thought shall control every thief,
And keep him outside the plantation ?
It passes belief.

Already too long we have tarried,
There must be no further delay,
For the lawless ruffians have harried
Estates by night and by day.
We cannot compete against numbers,
For even Jupiter nods :
While the worn-out manager slumbers
They prey on his pods.

If fear were true wisdom's beginning
We might have some hope,
But Justice to strangle their sinning
Has no proper scope.
She threatens, in case of detection
In thieving and fraud,
o each felon her fullest protection,
Free lodgings and board !

SUGAR PALM IN FLOWER.

One of the group of palms in the triangular space between Muirburn House and the banyan tree, Park Street, is reported to be in flower. The palm is *Arenga saccharifera*, and it may be of interest to watch the development of the flowering. From the *Treasury of Botany* we quote as follows:—*S. saccharifer*, the Areng, is a very common palm in the Indian islands, and on account of the variety of its products is of great value to the natives. The black horsehair-like fibre surrounding its leaf-stalks, called Ejoo or Gomuti by the Malays, is converted into cordage, employed for thatching, plaited into ornaments, &c.; a large supply of toddy or palm-wine is obtained by cutting off the flower-spikes, and this when inspissated affords an abundance of sugar, or when fermented a capital vinegar: considerable quantities of sago, of a rather inferior quality is, also derived from this palm, and several other products of minor importance.

COLOMBO TEA SALES FOR THE YEAR 1890.

The last public sale of tea to be held in Colombo during 1890 took place today, and brought up the total quantity of tea sold during the year to 6,114,525 lb., as compared with 4,627,762 lb. sold locally during 1889. Taking our shipment this year as 43* million lb., the quantity sold locally represents 14 per cent of this—the same percentage as was sold in Colombo last year—so that relatively to the increase of shipments the sale of tea in Colombo is not growing at all. The figures showing the quantity of tea sold in Colombo for the past three years compare as follows:—

	Offered.	Sold.	Percentage to total shipped.
1887-88 ...	3,579,047	2,783,429	13
1889 ...	6,841,529	4,627,762	14
1890 ...	8,867,510	6,114,525	14

Of this quantity sold locally, about 3 million lb. have been this year purchased for, and shipped to markets other than London, and the average rate paid for the whole of the tea for the year has been 43½ cts. The following table compiled by us will show the weekly quantities offered and sold, whilst the averages of each sale have been kindly supplied to us by Messrs. Forbes & Walker, the well-known Colombo brokers:—

1890

Date.	Offered. Pkgs.	Offered. lb.	Sold. Pkgs.	Sold. lb.	Forbes and Walker's Average. cts.
January					
8	2980	194715	2475	160463	45
15	3064	209491	2365	160022	45
22	2567	182529	1503	106675	41
29	1675	123064	1254	92153	42
February					
5	1563	102317	920	56936	41
12	2714	126740	1085	80923	44
19	2093	269324	1285	159698	45
26	1153	77178	1021	68247	42
March					
5	1012	68418	744	48559	40½
12	1624	113318	1093	77219	43
19	1946	135036	1829	58506	41
26	1920	134533	1136	75412	43
April					
2	1695	103935	1142	65960	42
16	3978	270091	2266	158358	39
23	2186	146630	1294	80077	38
30	1354	90893	1111	71511	39
May					
7	2008	139547	1761	121240	42
14	3142	200105	2140	129207	42
21	2784	186559	2498	161511	43
28	2918	194814	2453	163175	42
June					
4	2318	150240	2112	138701	47
11	3785	271295	3298	231814	45
18	3310	254764	2919	228432	47
25	2941	194641	2293	150289	46
July					
2	2728	193886	2093	146779	47
9	2294	154133	1902	128419	47
16	4059	370194	3453	231325	40
23	2350	173895	1502	110406	36
30	1514	108114	1167	83320	38
August					
6	1762	120261	1675	114903	40
13	2142	150665	1364	90157	39
20	1709	130230	1289	97767	38
27	1969	150773	1560	114705	41
September					
3	1801	123163	1654	114128	40
10	2177	172973	1918	157193	44
17	1936	140921	1640	116332	45
24	2637	184222	2439	171143	47
October					
1	1882	133865	1724	121920	50
8	3080	220871	2240	155245	49
15	3698	271065	1931	142026	44
22	2586	197469	1292	94419	39
29	1627	141562	816	73524	44
November					
5	2278	172153	1413	96567	42
12	3229	239375	1877	143454	43
19	3530	255484	1781	118629	41
26	2470	177294	1372	92805	41
December					
3	2837	197294	1622	102567	40
10	3104	235396	2070	159095	40
17	3764	286011	2329	167536	39
23	3081	226064	1762	124773	40
Total	122976	8867510	87882	6114525	

—Local "Times."

* It is in reality over 45 millions lb.—ED. *T. A.*

LANKA PLANTATIONS COMPANY, LD.

CACAO, COFFEE AND TEA.

The ordinary general meeting of the shareholders of the Lanka Plantations Company, Limited, was held, on Wednesday, at the offices, 8, Old Jewry, E.C., Sir Robert Harding presiding.

In moving the adoption of the report the Chairman said that the advices which they had received from their manager continued to be of a character which would lead them to hope and believe that the current year would certainly not be worse than the year under review. He did not desire to be too sanguine, because they had had many disappointments previously; still, he thought they might consider that the company had now turned the corner. They now had between 1,400 and 1,500 acres of tea under cultivation, the average produce of which was about 300 lb. per acre. Therefore, they would have 450,000 lb to dispose of next year, which would, no doubt, give them very satisfactory dividends. The greatest economy had been exercised by their superintendent. The year's working had resulted in a profit of £7,292, which was sufficient to pay the dividends on the preference shares for the present and the previous years, and also 3s per share on the ordinary shares. That was a better state of things than they had had for some years past, and he believed it was the beginning of more prosperous times.

Sir Herbert B. Sandford seconded the motion.

Mr. Bayford pointed out, in the course of a long speech, that it was unwise, in the present position of the company, to pay a dividend, but that it would be far better to reduce the debt of the company.

The Chairman having replied, the report was adopted.—*H. & C. Mail* Dec. 5th.

A VISIT TO CHILAW:—COCONUT CULTIVATION.

Our chief point has reference to the steady extension of cultivation wherever there is unoccupied ground along the fifty miles of road to Chilaw. We saw evidence of a change, since our last visit in September 1888. The fruit-trade—specially in plantains—between the Chilaw district and Colombo is growing in importance. All round—in and about—Chilaw town, the little fields of tobacco are very well-defined, the young plants being at present the objects of great care in watering morning and night. Beyond Chilaw, the new Telegraph wire is conspicuous on its way to Puttalam; when carried to Mannar, it will give an alternative line—a very important matter—between that point and Colombo.

A wide span is required to carry the wire over the Deduruoya; but we found that river—the next to be bridged we should think—far less in depth and breadth of water than we had anticipated at this time of year. This reminds us to remark on the neatness and yet great strength of the new Toppu girder bridge beyond Negombo: it rests on substantial iron piles screwed into the bed of the Mahaoya. The bridge bears the name of the respected Factory Engineer, and is a great improvement (though rather narrow inside) on the old wooden bridge, and especially on the ferry we crossed two years ago.

Finally, we have to remark on the important scene of Coconut Cultivation in the Rajakadaluwa district north of Chilaw. Mr. G. D. Miller, the pioneer, and the sole European planter who has ventured down there, has now demonstrated to the satisfaction of some of the best authorities in the island that the climate and soil are well suited for coconuts. Mr. Miller's own four and five years' old palm trees, notwithstanding the prolonged drought after the South-West monsoon of this year, are most promising, and this gentleman will shortly have 1,000 acres planted altogether, on the group of plantations under his care. There is no reason, we believe, why the coconut palm should not be planted and succeed alongside the thirty miles of road to Puttalam. The character of the soil makes up to a great extent for the short rainfall. Mr. Jardine who rather shook his head on his first visit with us in September 1888, a few months ago on a second visit, quite changed his opinion and he has reported very favourably of the prospects of the Rajakadaluwa and Toynbee plantations. Here then is a planting industry established in a remote district, mainly through the indefatigable exertions of one man, and the amount of good he (with his fellow-proprietors) have done to the poor people around him, both Sinhalese and Tamil in affording them welcome employment and in stimulating them to give more work to their own gardens, cannot be overestimated. All success, say we, to Rajakadaluwa and its spirited, hardworking proprietor Mr. G. D. Miller.

AGRICULTURAL COMPANY OF MAURITIUS announce an interim dividend of 1s per share, or at the rate of 10 per cent. per annum, for the half-year ending Sept. 30th, payable, tax free, on Dec, 24th at the Alliance Bank.—*O. Mail,*

THE KOLA NUT.—The wonderful stories that have been told of the properties of the kola nut are more than confirmed by our Consul at Bahia, who has written a special letter to Lord Salisbury on the subject. The West African carriers at that port, who use kola, and carry the bean wrapped in banana about their persons, are not physically speaking superior men to the Brazilian negro; yet the African, through constantly masticating kola can, we are assured, endure fatigue which no Brazilian traveller can withstand. Where it takes eight Brazilian negroes to carry a load with difficulty, four African porters carry it cheerfully, singing and chanting as they trudge along, each with a bit of kola bean in the mouth. As a rule the kola-eating African gangs who labour at the hard task of unload ing vessels earn, we are told, twice as much as their competitors. The beans, which are described as unintoxicating and in no way injurious, are said to act as a nutritive, and quench thirst; yet they are not strictly a stimulant. The supply at Bahia comes from Lagos. It is best soon after it is gathered, and is sold according to freshness at twopence or threepence for each bean. It appears that the attention of the Government of India has already been called to the extraordinary properties of kola nuts, and practical information has been supplied to them from the authorities at Kew.—*A. F. Press.*

THE I. M. S. "INVESTIGATOR" AND THE COCOS ISLANDS.

The I. M. S. "Investigator," which is now in harbour, has recently been surveying the Great and Little Cocos, islands to the North of the Andamans, which must not be confounded with the Cocos, or Keeling Islands, to the South of Sumatra. Both islands are uninhabited and belong, we believe, to a Rangoon Barrister who has leased them from Government for fifty years as a speculation. Forty years ago or more an attempt was made to effect a settlement on the Great Coco, which is 6 miles in length by 2 miles in breadth, by three Europeans, one East Indian and eight Burmese; but the project had to be abandoned as seven of the party succumbed to fever. The island is surrounded by a strip of white coral beach, on which grows an almost continuous belt of coconut trees, whence its name is doubtless derived. Within the belt is nothing but forest and jungle. Up till now it has always been supposed that neither of the islands contained any fresh water. In 1874 a very careful examination was made, but without any drinking water being found, although it was said by some natives that a good tank did exist somewhere. Curious to say, the officers of the "Investigator" have now discovered fresh water on both. One officer also bagged a strange specimen of a teal, which has been sent to Calcutta for identification. Dr. Alcock, the ship's Naturalist, during the time that he has been on board has been paying special attention to marine biology, a science which may be said to be still in its infancy, Dr. Alcock has made some important discoveries both during last season and this. The most interesting discovery, perhaps, is that of highly luminous deep sea crustaceans, which were dredged at a depth of 3,000 feet on the voyage round from Bombay. According to a correspondent this is believed to be the first positive proof that the source of light in the dark abysses of the ocean is the self-luminosity of the animal inhabitants. A large prawn lying in a bucket of sea water on deck was observed to be shining brightly, and, being seized, it emittes copious clouds of phosphorescence from the orificed of the genital glands. By the light of this luminous secretion Mr. Alcock was abl , though otherwise in perfect darkness, to see the details of the interior of the bucket, and his own hands as well as the position and shape of the animals in the bucket. After the removal of the animal the water remained luminous for some time. Other crustaceans were also luminous, but to a less extent. Dr. Alcock's name as a marine biologist is likely to be heard of frequently in the future, for he has the most favourable opportunities of pursuing his work of scientific research. The Government of India has provided him with expensive apparatus necessary for dredging the deep sea bottom, and the Bay of Bengal as a field for investigation has so far been hardly touched except round the coasts. It can hardly be doubted that its tropical waters contain many wonders, which so far have never seen the light of the sun.—*Madras Mail*, Oct. 19th.

PROGRESS IN THE NEGOMBO DISTRICT.

COCONUT AND IRRIGATION—COIR FIBRE—OIL, &c.

We congratulate Mr. Akbar, the spirited proprietor of Katukande coconut plantations (600 acres in cultivation) on the banks of the Mahaoya, on securing the services of Mr. Wm. Lawrance late of the Badulla district, as his Engineer and Manager. Mr. Lawrance is a practical engineer trained in one of the first establishments in Aberdeen, and he has also had prolonged experience as a planter. Katukande is a very important charge; for besides the estate, Mr. Akbar has a large Coir Fibre Mill employing some 400 people on the property, and it is also the scene of most

interesting Irrigation experiments, the pumps being worked by a 30 horse-power engine. It is now Mr. Akbar's wish to erect an extensive Saw-mill, the machinery for which is all ready for Mr. Lawrance to see put together.

Apart from Katukande Mr. Akbar owns the Hunupitiya Oil Mills in Negombo under the care of Mr. James Brown as Engineer and which do an extensive business.

Furthermore, this enterprising Ceylonese gentleman is just maturing his plans to run a paddle steamer early next year between Negombo and Colombo, the passenger rates by which are likely to be so moderate as one, half and quarter rupee each, according to class. We heartily wish all success to the steamer, to Katukande, its mills and pumps, to Hunupitiya and to Messrs. Lawrance and Brown in Mr. Akbar's service.

SENDING TEA DIRECT TO LONDON.

Among the various proposals put forward lately to improve the present state of the tea trade, none strikes one as so obviously absurd as that of sending all tea direct to London. That London at present rules the other markets is admitted by even the men who suggest this. "Proprietor" in his very practical letter touched the root of the matter when he remarked:—"I am of opinion that so long as an increasing quantity of tea is yearly poured upon one (the London) market, the sterling price for the same is not likely to rise! This to every one with the slightest knowledge of supply and demand is obvious. With the present state of prices can the producer afford to ignore a single outlet, Calcutta, Bombay, Australia, New Zealand, the Cape, or any other, no matter how small the quantity wanted? Is it not to his interest to encourage competition from every market in a place where he has at least some slight touch? The idea of a small proprietor being left to the tender mercies of the London market with the entire crop going there—no competition—is suicidal. The saving of importers' profit is brought forward, but what guarantee have we that it would reach the proprietor. It is extremely doubtful if these profits are worth having. I am told that one has only to know the names of the many firms who have given it up during the last six years,—one very notable case fresh to memory—to be sure that in this branch, as in every other, the keenest competition exists. Added to which there is no secrecy about it, as the prices of all teas sold in public auction in London appear in the catalogues, many copies of which are weekly sent to India to all large firms. Enquiring the other day in order to find out what was being done to push Indian tea, I was informed that most of the large firms in Calcutta have a "buyer," who, during the off season, is sent to various places, London, Australia, New Zealand, America (this last, my informant added, will certainly increase its consumption) in order to study the different requirements, and push Indian teas generally, by sending suitable grades, and that these are the men who are reported to "come out" every year to import tea, and the only people, so far as I could learn, who are doing anything to open the fresh markets we so much need.

Ceylon men certainly set an example to us, in the way that the producer is always ready to respond to any effort in the above direction. India seems content with the comforting idea that at some future date Ceylon is "going out." The tea certainly has been leaving the country in alarmingly increasing quantity for the past five years, and many gardens in India seem nearer "going out" point than their despised competitor. As a producer, I would certainly prefer to sell my tea at a market where competition from all centres comes in; and it does not strike me as likely that those above mentioned will send to London for what they want. In any case the increased charges, freight, etc., would not come out of the consumers' pockets, and it is certainly not desirable for the supplying of these places to fall into the hands of one or two of the largest owners or agents. I have not yet found a producer with a thorough knowledge of both markets advocate it, although the steady sellers in Calcutta number among them many names of men who have not the reputation of making mistakes. It is reported by experts both in London and Calcutta that this year's crop is a very poor quality one, and I suppose this must be accepted, as it is borne out by the continual bad weather reports from nearly all parts. This, together with the high exchange (how we used to grumble at 1-4½), is said to account for the exceptionally low prices, and it is to be regretted that both causes should come together. Probably economy could be effected in small ways, and it would be well for all interested to look to his, but one fact remains that until London is relieved from the weight of tea that at present goes there, prices cannot rise to any extent. Fresh markets must be opened, certainly none abolished, or many of the smaller gardens will either be closed or become absorbed by their larger neighbours. A remark I overheard the other day struck me rather forcibly: there are some gardens in India that produce such tea as will never increase the consumption, and by quantity only help to reduce prices, and if some of these did go to the wall, it would not be an unmixed evil.—*Englishman.*

THE TOBACCO INDUSTRY IN NORTH BORNEO.

You will, I daresay, have noticed by the Singapore and other papers, during the last two years, that considerable attention has been attracted to the Western Division of Dutch Borneo, principally on account of the numerous gold and diamond mining concessions taken up there, and also in connection with the concessions or contracts of land for tobacco planting, these latter being almost entirely confined to the Sambas district of Western Borneo. It may interest your readers to hear what has been done in the way of planting there.

As in the Straits and British North Borneo, so in Sambas, the credit of giving a start to planting belongs to the ex-Ceylon Planter. Towards the end of 1887 a Syndicate was formed by a few gentleman in Singapore, to apply for and take some gold mining concessions in Sambas, and young W——was sent across to get the necessary documents signed. While in Sambas, the Sultan, hearing he was a planter, advised him to have a look at the land in the Sangauw district, some four to five day's journey up the Sambas river, and where the Sultan had been experimenting with Liberian Coffee, Pepper, and Cacao. W——acted on this advice and was so much taken with the quality of the soil and the general appearance of the country that on his return to Sambas he applied for 10,000 bouws of land in the Sangauw district for the Syndicate he represented, and it was granted on fairly reasonable terms after a few months.

Samples of the rich, chocolate-coloured soil brought over by W——to Singapore were shown to practical Sumatra tobacco-planters, who without exception expressed the opinion that better soil for tobacco could not be desired, and the only doubt was as to whether the climate of Sambas was suitable or not.

In a short time a Syndicate was formed in Singapore for the purpose of carrying out the experiment on a proper scale of, say, 80 to 100 fields, and an experienced Dutch Deli planter was engaged to carry out the work.

The first opening was made at "Simedoem," 12 miles by cart-road from the Kampong Sangauw, where river carriage ceases, the card-road being constructed partly by the estate and partly by the Sultan. Nothing could be finer than the soil on this estate, and the work of clearing, roading, and draining &c., was carried out in the most approved Deli manner. Here I may remark that from what I have seen and heard the general run of such work as roading and

draining, carried out on tobacco estates in Deli and elsewhere, would be considered much too elaborate and expensive by the generality of Ceylon planters. The year 1887-88, when the land in question was selected, was an exceptionally dry one, but unfortunately the year of the above experiment, 1889, was abnormally wet, and this, added to the fact that the estate was at an elevation of 1,000 to 1,200 feet above sea level, and was shut in on three sides by hills, causing the morning mist to lie long in the hollow, all told against the success of the experiment which, in fact, as far as this particular spot was concerned, was pronounced a failure.

In the meantime, however, acting on the advice of their Manager, the Syndicate had applied for several lots of land on the banks of the Sambas river, and within a few miles of the town of Sambas, and on one of these contracts an experiment on a much smaller scale was tried, with the result that the tobacco produced was pronounced by competent judges to be equal to the best Deli produce. As you can understand, all this experimental work had cost the syndicate a considerable amount of money, and they wisely decided to lie on their oars for a little to see what the result was from the first planting by a Dutch Company which had followed in their footsteps on the lower alluvial land.

I had the pleasure of meeting the Managing Director of the Tabak Maatschappij, Sambas, Mr. Leyssiens, an old Deli planter, just after he had visited the Serabe estate belonging to the Company, and he expressed himself as perfectly satisfied with the quality of the tobacco produced, and the prospects of his Company and tobacco planting in Sambas generally, provided the labor difficulty could only be satisfactorily arranged. It is the quality and not the quantity of the labor which constitutes the difficulty, as in nearly every batch of Chinese brought over from Singapore you are sure to find some black sheep turned out of Deli, and they very soon manage to contaminate the raw cooly fresh from China. Severe measures must be taken with such men, and I think there is every hope that such will be enforced, as the new resident for the Western Division of Borneo, The Hon. S. W. Tromp, was for several years a Controlleur in Lankat-Deli, and thoroughly understands dealing with refractory Chinese. Surprize has been expressed over here at the Singapore Syndicate not going ahead and opening up land; but I think they are quite justified in lying back a little now, having already, in a very plucky manner, sunk a considerable sum of money in the country, and, as they hold the very pick of the land considered suitable for tobacco-planting, directly other estates are opened up their land will be very much increased in value, and they will then find no difficulty in disposing of it to advantage, or getting others to provide the necessary capital for opening on a large scale. I sincerely hope, and have every reason to think, that they will not only get back the money already sunk in the country, but derive a handsome profit as well; and they well deserve it, and it will be entirely owing to the pluck of the Singapore Syndicate, who risked their money at first, if Sambas ever proves the rival to Deli some expect it to be.

I hear that several estates are to be opened up this year, and there is now direct communication with Singapore by steamer once a month, and also per Government steamer with Pontianak once a month. The terms on which planting contracts in Dutch Borneo are held are as follows:—The land is granted on a 75 years' lease by the Sultan and Rulers and their Chiefs, with the approval of the Dutch Government, and the contractor binds himself to pay the following rent, viz., one guilder per bouw on one-fifth of his contract at the end of the first year; one guilder per bouw on two-fifths at the end of the second year; and so on up to the end of the fifth, when he pays one guilder per bouw on the full extent of the contract. As there are now from 25 to 30 contracts in force in Sambas, averaging 10,000 bouws each, you can understand that the Sultan of Sambas will derive a very handsome and yearly increasing income from this source alone. The whole of the Sambas territory, you may say, has been taken up either as planting contracts or gold-mining concessions, the Sultan's royalty on the latter being 2½ per cent. of the gross minerals produced.

The Sultan of Sambas is a courteous, educated native gentleman, having been educated in Java, and he rightly enjoys the full confidence of the Dutch authorities. The advancement of Sambas from the nest of pirates it was not so very many years back to what it is now is entirely due to the Sultan's just and enlightened rule under the guidance of the Dutch Government.

—Local "Times." KAMBAR.

A "SCRUB EXTERMINATOR" has been invented in Melbourne; and a sample of the preparation—which, while killing the plants, ought not to injure the soil—has been sent to the Government of Madras for trial.

"COORONGITE" is a mineral substance very like india-rubber, and was originally discovered some years ago near Salt Creek, a tributary of the Coorong inlet at the mouth of the Murray River in South Australia. It is found in swamps and hollows of the sand. Some believe it to be of vegetable origin, and a species of gum or lichen, while others consider it a residue of petroleum. Boreholes have lately been sunk on the ground, and a depth of 500 feet attained, but without striking any oil.—*Globe.*

CEYLON EXPORTS AND DISTRIBUTION 1890

COUNTRIES.	Coffee cwt.			Cinchona.	Tea.	Cocoa.	C'moms.	Cinnamon.		Coconut Oil.		P'bago.
	Plantation	N'tive	Total.	1890 B'nch &Trunklb.	1890 lb.	cwt.	lb.	Bales lb.	Chips lb.	1890 cwt.	1889 cwt.	1890 cwt.
To United Kingdom ...	54962	121	55083	7930606	42828743	11334	154819	1069837	237635	94151	118029	159843
,, Marseilles	157	...	157	12500	1462	80	...	105960	8800	3000	...	...
,, Barcelona	..	...	...	...	1150	...	...	45000		...	..	...
,, Genoa	12	...	12	...	3554	...	...	100765	39424	4330	3482	1134
,, Venice ...	118	232	350	70412	2455	...	...	11100	11200	200	401	...
,, Trieste	7941	97	8038	546	4100	...	7393	8900	20048	18333	10239	...
,, Odessa	32	...	32	...	275	...	...	...	...	8062	5415	...
,, Hamburg	296	...	296	730	43026	913	1131	297882	91972	19381	9071	35232
,, Antwerp	19	20	39	217919	1600	...	...	22000	11312	1565	1492	16545
,, Bremen	20	...	20	...	25578	151	.	29948	...	...	..	6895
,, Havre ...	...	100	100	..	4761	8	...	10000	...	2007	4578	...
,, Rotterdam & Amsterdam	3	...	3	21384	...	55	...	...	11200	10	...	1616
,, Africa	16	...	16	...	40382	...	...	5000	...	17	34	...
,, Mauritius and Eastward	299	333	632	...	99530	498	..	28500	...	41265	7270	...
,, India	1609	718	2327	...	128069	...	197267	7220	...	88129	43074	374
,, Australia & New Zealand	11630	1306	12936	...	2552861	9	40	8474	4256	1821	1944	406
,, America	1924	...	1924	401893	201098	1840	4956	89228	...	58100	101072	150457
,, Stockholm	...	...	...	...	1703	...	...	...	...	...	...	...
,, Constantinople ...	...		...	.	3122	...		...	...	...		...
Total Exports from 1st Jan. to 31st Dec. 1890	79038	2927	81965	8655990	45943469	14888	365606	1839814	435847	340371		372502
Do 1889	81416	4583	86117	9435715	33337145	18742	295095	2279284	518536	327652		452224
Do 1888	130469	8814	139283	13251120	23670268	12936	260443	1657332	465886	365852		235764
Do 1887	164138	8166	172552	11996039	12938040	15915	329474	1489034	319972	284607		230635

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, December, 18th 1890.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White ...	{ Slightly softish to good { Hard bright... ..	£5 10s a £7 10s
Yellow ...	Do, drossy & dark ditto...	95s a 110s
CINCHONA BARK--Crown per lb.	Renewed	4d a 10d
	Medium to fine Quill ...	6d a 9½d
	Spoke shavings	3d a 9d
	Branch	1d a 3d
Red	Renewed	2d a 10d
	Medium to good Quill...	4d a 9½d
	Spoke shavings	2d a 5d
	Branch	1d a 3d
	Twig	1d a 1½d
CARDAMOMS Malabar and Ceylon	Clipped, bold, bright, fine	1s 8d a 3s
	Middling, stalky and lean	10d a 1s 6d
Alleppee	Fair to fine plump clipped	1s 4d a 3s
Tellicherry	Good to fine ...	1s 3d a 2s 3d
	Brownish ...	9d a 1s 3d
Mangalore	Good & fine, washed, bri[ght]	1s 6d a 3s 3d
Long Ceylon	Middling to good... ...	1s a 2s 3d
CINNAMON 1sts	Ord. to fine pale quill ...	7½d a 1s 5d
2nds	,, ,, ,, ,, ...	7d a 1s 3d
3rds	,, ,, ,, ,, ...	5¾d a 1s 2d
4ths	Woody and hard	5½d a 10d
Chips ...	Fair to fine plant... ...	2d a 7½d
COCOA, Ceylon	Bold to fino bold ...	110s a 115s
...	Medium	95s a 101s
...	Triage to ordinary ...	55s a 85s
COFFEE Ceylon Plantation	Bold to fine bold colory ...	110s a 112s 6d
	Middling to fine mid. ...	104s a 107s 6d
	Low mid. and Low grown	99s a 104s 6d
	Smalls	96s a 103s
Native	Good ordinary	87s a 92s
Liberian ...	Small to bold	85s a 93s 6d
East Indian ...	Bold to fine bold... ...	105s a 115s
	Medium to fine ...	100s a 105s
	Small	95s a 102s
Native	Good to fine ordinary ...	87s a 92s
COIR ROPE, Ceylon & Cochin	Mid. coarse to fine straight	£14 a £20 15s
FIBRE, Brush ...	Ord. to fine long straight	£14 15s a £27 5s
Stuffing ...	Coarse to fine	£7 a £25
COIR YARN, Ceylon ...	Ordinary to superior ...	£15 a £30
Cochin ...	Ordinary to fine	£15 a £40
Do ...	Roping fair to good ...	£12 a £16 5s
COLOMBO ROOT, sifted ...	Middling wormy to fine...	18s a 27s 6d
CROTON SEEDS, sifted ...	Fair to fine fresh... ...	10s a 15s
GINGER, Cochin, Cut	Good to fine bold... ...	50s a 63s
,,	Small and medium ...	26s a 39s
Rough	Fair to fine bold	18s a 25s
,, ...	Small	16s a 21s
GUM ARABIC, Madras...	Dark to fine pale ...	15s a 25s
NUX VOMICA ...	Fair to fine bold fresh ...	10s a 12s
...	Small ordinary and fair...	6s a 8s 6d
MYRABOLANES, pale ...	Good to fine picked ...	10s a 11s
	Common to middling ...	8s 9d a 9s 3d
	Fair Coast...	9s a 9s 6d
Pickings	Burnt and defective ...	4s 9d a 6s 3d
OIL, CINNAMON ...	Fair to fiue heavy ...	1s a 2s 6d
CITRONELLE ...	Bright & good flavour ...	11-16d a ¾d
LEMON GRASS ...	,, ,, ,, ...	1¼d a 1½d
ORCHELLA WEED ...	Mid. to fine, not woody...	20s a 33s
PEPPER, Malabar, blk. sifted	Fair to bold heavy }	4¼d a 4⅝d
Alleppee & Cochin ,,	,, good ,, }	
Tellicherry, White ...		1s a 1s 1d
PLUMBAGO Lump ...	Fair to fine bright bold...	15s a 19s
	Middling to good small...	11s a 14s
Chips ...	Slight foul to fine bright	9s a 12s
dust ...	Ordinary to fine bright ...	5s a 9s
RED WOOD	Fair and fine bold ...	£4 10s a £4 15s
SAPAN WOOD ...	Middling coated to good	£5 a £8
SANDAL WOOD, logs ...	Fair to good flavor ...	£30 a £58
Do. chips ...	Inferior to fine	£9 a £30
SENNA, Tinnevelly ...	Good to fine bold green...	4d a 8d
	Fair middling medium...	3d a 5d
	Common dark and small	1d a 2d
TURMERIC, Madras ...	Finger fair to fine bold [bright]	16s a 18s
Do. ...	Mixed middling ...	15s a 16s
Do. ...	Bulbs	10s a 12s 6d
Cochin ...	Finger	16s a 17s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	15s a 22s
2nds	Foxy & reddish 5 a 8 ,,	12s a 16s
3rds	{ Lean & dry to middling { under 6 inches ...	8s a 11s
4ths	Low, foxy, inferior and [pickings	3s a 7s
FROM BOMBAY AND ZANZIBAR.		
ALOES, Socotrine ...	Good and fine dry ...	£4 a £7
Zanzibar & Hepatic ...	Common and good ...	40s a £5 5s
CHILLIES, Zanzibar ...	Fair to fine bright ...	36s a 42s
	Ordinary and middling...	28s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
CLOVES, Zanzibar and Pemba, per lb }	Good and fine bright ...	3⅞d a 4d
	Common dull to fair ...	3½d a 3⅝d
Stems...	Common to good ...	¾d a 15-16d
COCULUS INDICUS ...	Fair ...	12s a 13s
GALLS, Bussorah & Turkey ℘ cwt. }	Fair to fine dark blue ...	52s 6d a 58s 6d
[cwt.	Good white and green...	40s a 47s 6d
GUM AMMONIACUM per	Blocky to fine clean ...	40s a 100s
ANIMI, washed, ℘ cwt.	Picked fine pale in sorts,	£13 a £14
	part yellow and mixed	£10 a £12
	Bean & Pea size ditto ...	£5 a £8 10s
	amber and red bold ...	£10 a £11
scraped...	Medium & bold sorts ...	£5 a £7
ARABIC E.I. & Aden ..	Sorts	32s a 70s
per cwt. Ghatti ...	Sorts to fine pale ...	22s a 57s 6d
Amrad cla	Good and fine pale ...	70s a £5 17s 6d
	Reddish to pale brown ...	25s a 55s
ASSAFŒTIDA, per	Clean fair to fine	26s a 50s
cwt.	Slightly stony and foul ...	16s a 25s
KINO, per cwt.	Fair to fine bright ...	25s a 37s 6d
MYRRH, picked ,,	Fair to fine pale ...	£5 a £7 10s
Aden sorts	Middling to good ...	62s a 80s
OLIBANUM, drop	Fair to fine white ...	30s a 51s
per cwt. ,,	Reddish to middling ...	22s 6d a 27s
pickings...	Middling to good pale ...	12s a 19s
siftings ...	Slightly foul to fine ...	10s a 13s
INDIARUBBER Mozambique, }	red hard ...	1s 10d a 2s 2d
per lb. Ball & Sausage }	white softish ...	1s 3d a 1s 8d
	unripe root ...	1s a 1s 3d
	liver ...	1s 2d a 1s 10d
FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per lb	Nearly water white ...	4⅞d a 5d
2nds ,, ...	Fair and good pale ...	3¾d a 4d
3rds ,, ...	Brown and brownish ...	3¼d a 3½d
INDIARUBBER Assam, per lb.	Good to fine ...	2s a 2s 4d
	Common foul and mixed	9d a 1s 8d
Rangoon ...	Fair to good clean ...	1s 10d a 2s 4d
Madagascar	Good to fine pinky & white	2s 2d a 2s 6d
	Fair to good black ...	1s 8d a 2s 10d
SAFFLOWER ...	Good to fine pinky ...	50s a 60s
	Middling to fair ...	40s a 45s
	Inferior and pickings ...	15s a 25s
TAMARINDS	Mid. to fine *black* not stony	9s 8d a 10s 10d
	Stony and inferior ...	4s a 6s
FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt. ...	Fair dry to fine bright ...	20s a 22s 6d
,, ...	Common & middling soft	12s a 19s
Natal	Fair to fine ...	none here
ARROWROOT Natal per lb	Middling to fine ...	2d a 3d
FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℘ cwt.	Good, pure, & dry white }	157s 6d a 160
Japan ...	,, ,, pink }	
GAMBIER, Cubes, cwt. ...	Ordinary to fine free ...	35s
	Pressed	Nominal 30s
Block [per lb.	Good ...	22s 3d
GUTTA PERCHA, genuine	Fine clean Banj & Macassar	3s 6d a 5s
Sumatra...	Barky to fair	2s a 3s 9d
Reboiled...	Common to fine clean ...	4d a 2s
White Borneo ...	Good to fine clean ...	2s a 3s
	Inferior and barky ...	1s 4d a 2s
NUTMEGS, large, per lb...	64's a 80's, garbled ...	2s 9d a 3s 1d
Medium ...	83's a 95's ...	2s 1d a 2s 9d
Small ...	100's a 160's ...	1s 5½d a 2s 6d
MACE, per lb. ..	Pale reddish to fine pale	2s 6d a 2s 11d
	Ordinary to fair ...	2s 2d a 2s 4d
	Chips and dark ...	1s 11d a 2s
RHUBARB, Sun dried, per lb.	Good to fine sound ...	1s 3d a 3s 3d
	Dark ordinary & middling	8d a 1s 3d
High dried ...	Good to fine ...	1s a 1s 1d
	Dark, rough & middling...	6d a 9d
SAGO, Pearl, large, ℘ cwt.	Fair to fine ...	13s a 14s
medium ...	,, ,, ,, ...	11s 6d a 12s 6d
small ...	,, ,, ,, ...	9s 6d a 11s
Flour [per lb.	Good pinky to white ...	9s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine ...	1⅞d a 2½d
Singapore ...	,, ,, ...	1-11-16d a 2d
Flour ...	,, ,, ...	9s a 15s
Pearl ...	Bullet, per cwt. ...	18s
	Medium ,, ...	15s 3d a 17s 6d
	Seed ,, ...	16s

THE MAGAZINE

OF

THE SCHOOL OF AGRICULTURE,

COLOMBO.

Added as a Supplement monthly to the "TROPICAL AGRICULTURIST."

The following pages include the contents of the *Magazine of the School of Agriculture* for January :—

TECHNICAL INSTRUCTION.

In an able article in the *Westminster Review* of July last by Professor Andrew Gray, an attempt is made to state what technical education really means "First, then," says Prof. Gray, "technical education is education principally in the theory and the application of the scientific principles which underlie ordinary industrial operations, from the general economic laws which regulate commerce and trade, to the theory of the tools and processes of the craftsmen.....It is the assimilation of a carefully-reasoned out and coherent scheme of instruction in the general elementary principles of mathematics mechanics, chemistry, economic and natural science, with their applications, including also modern languages, literature and history, a scheme which will make the workman a thinker a self-directing intelligence, instead of a dull lifeless machine. The notion is much too prevalent that such education being useful is, therefore, necessarily a lower kind of education than that contained in the traditional curricula of our public schools and universities. It is also too much the habit of mind of those who have been trained, or more frequently those who, having spent some little (time) in the Academic groves, and heaving breathed the same air with scholars and philosophers, only *fancy* they have been trained, in the old Humanities, to regard all instructions in the great departments of human knowledge which modern civilization and scientific discovery have called into existence with contempt, or at any rate, as unworthy the attention of a man of 'culture.'"

These words come with great force from a writer of Prof. Gray's experience, and should go far towards the end for which the article, from which we quote, was written, namely to dispel a considerable amount of misapprehension as to the meaning and scope of technical education. Even in the case of agricultural education in Ceylon there has been this feeling of contempt referred to above, and ridicule, as stated by the speakers at the recent prize distribution held at the School of Agriculture; and a good deal of gratuitous but unwelcome advice is continually being thrown out, while some are ever ready to decry and censure every effort made in this direction. One critic has gone the length of saying that the funds available to the School of Agriculture have been misappropriated! The founder of the School of Agriculture was evidently not one of those who, according to Prof. Gray, misapprehended the meaning and scope of technical education in agriculture, when he formulated his scheme of education for agricultural students in Ceylon, so as to make them "thinking, self-directing intelligences." It is a trite saying that the prosperity of a country depends upon the state of its agriculture, but it is none the less true, and was well illustrated in the history of our own Island. And it is for the education of the natives of this country in agriculture that some would grudge a modest expenditure on the part of the Government; this too at a time when the necessity for such education is being recognized in every part, even the remotest, of the globe.

But it is an encouraging thought that the rulers and leaders of the people are among the patrons of technical education; and with such words as the agricultural students heard from the speakers at the School of Agriculture last month,

impressed on their minds, they should not mind the attempts of a few ill-willed critics who delight in obstructive work, to discourage them.

The School of Agriculture has for one thing, as stated by the new Director of Public Instruction, fostered an intelligent pride in good honest work and a sense of its dignity, and its *alumni* are setting an admirable example to the students of the coming Technical Institute, the expected benefits of which are thus well summed up:—"The systematising of the instruction and training of our craftsmen, extending already existing industries, creating new ones, assisting the development and bringing about a more economic utilization of the resources of our country."

OCCASIONAL NOTES.

His Excellency Sir Arthur Havelock, who since his arrival has been going through most of the public institutions in Colombo, paid what may be said to be a surprise visit to the School of Agriculture on Monday the November. He was accompanied by Mr. Gerald Browne, P.S. and Mr. H. W. Green, late Director of Public Instruction —Mr. Cull, the present Director, being absent on inpection duty in the Southern Province. His Excellency spent a good while in looking over the chemical laboratory, inspecting the newly-started dairy, and walking over the grounds, part of which was occupied at the time with paddy, Indian corn, sugarcane, arrowroot, turmeric, three or four varieties of cultivated grasses, native yams, beans and other vegetables. Some ploughing was also done with the improved "Cingalee" plough before His Excellency by one of the students. Before leaving Sir Arthur expressed himself "much interested in this useful institution."

On Tuesday morning, the 11th November, Mr. S. Davies, travelling agent to an American firm of implement makers, accompanied by Mr. W. H. Davies of Colombo, visited the school with the object of demonstrating the use of some new agricultural implements. A trial was first made of two hand implements known as the "Planet Jr.," double-wheel and single-wheel hoes. These were so constructed as to be furnished with various attachments for ploughing, moulding, drilling, harrowing, cultivating, raking and skimming. These little machines are as perfect implements as could be wished for, and did their work most admirably. The "Planet Jr." double-wheel hoe, which is furnished with two wheels, and weighs 40 lbs. is priced at £3-3 sterling, while the "Planet Jr." single-wheel hoe, furnished with a single wheel and weighing 26 lb costs £1-11-6 sterling. They are well adapted for all crops sown in rows, and would save an infinite amount of time and labour in the cultivation of such crops as Indian corn, arrowroot, sugar-cane, as well as in vegetable garden cultivation. A trial was also made with a horse hoe (attached to two buffaloes) which could also be fitted for ploughing, cultivating, &c. This implement weighs 65 lb and cost £2-15 sterling, and is, we learn, being much used in tobacco and sugarcane cultivation. Mr. Davies had just returned from India, where he introduced the new implements, which he assured us were having a very rapid sale.

Mr. A. E. Coltton claims to have discovered in the *Lathyrus Silvestris* "the fodder plant which successfully resists not only the most severe droughts, but also frosts, and deriving its moisture, carbonic acid and ammonia from the air, and air alone, grows luxuriantly, perennially producing enormous quantities of the finest possible fodder; the plant which in course of years will cover throughout the world the vast areas of arid, uncultivated, and at present mostly uncultivated land, supplying abundance of the most nutritious fodder to countless millions of horses, cattle, and sheep; the plant which will promote the permanent prosperity and progress of stock-farming and agriculture to a certain degree unknown before; the plant which will in due course form the greatest source of national wealth to every land."

In the *North British Agriculturist* of November 19th, Sir John Lawes, "the Isaac Newton of Agricultural Science," contributes an article on Nitrate of Soda. Dr. Lawes dissents from the view which many Chemists are inclined to take that the nitrogen of the root-crops is obtained by the plants from the atmosphere. His own experiments point to a very different conclusion, and he maintains that where root-crops can do without nitrogen if only supplied with phosphates, the soils are in a high state of fertility and contain a sufficient amount of nitric acid for the use of the crop. The result of a very long series of experiments account for two facts: One is, that a given weight of nitrate of soda yields a much larger increase of roots than the same weight of nitrogen in sulphate of ammonia; the other is, that whereas it is necessary to apply potash in addition to phosphates when we use salts of ammonia, there is no such necessity when we apply nitrate of soda. Dr. Lawes finds it difficult to explain why the nitrate is independent of any addition of potash, as soda is not found in the ripe seed, however abundant it may be in the growing plant, and it is therefore tolerably evident that it cannot take the place of potash in some of its more important functions. Even in the potato there is no soda. Although nitrate has a marked influence upon pastures, cereals, and roots, its action is most uncertain upon leguminous crops; it should not, therefore, be employed for them. Dr. Lawes unmanured four course rotation, commenced in 1848 showed that the Swedes which gave the largest crop the first year gradually diminished in yield, till now though these are good plants they form no bulbs at all. The unmanured wheat and barley, on the contrary, have all through this period produced fairly good crops, averaging 30 bushels of barley and 28 of wheat, and consequently taking up large quantities of phosphates from the soil. The necessity for supplying phosphate of lime to turnips, concludes Dr. Lawes, is not because the soil does not contain it, but because the plant cannot take it from the soil. Soils manured with nitrate of soda should be kept specially free from weeds owing to the great avidity which they have for this manure. Of course as the weeds decay, the nitrogen in the form of nitric acid is

returned to the soil, but this takes time, and so far as the crop for which the nitrogen is intended is concerned the effect of the manure is lost.

At last there is a fair prospect of a Techincal Institute for Ceylon. The following paragraph is from the report of the Sub-Committee of Council on the Supply Bill for 1891:—"The Sub-Committee strongly approve of the recommendation which has been made by the Government for the establishing of a Technical Institute in Colombo, and for the appointment of a Superintendent therefor. The services of a competent officer may, it is hoped, be secured for R5,000 per annum, and the Sub-Committee readily agree to the addition of provision therefor." This should delight the hearts of Mr. H. W. Green and the Hon'bles W. W. Mitchell and J. J. Grinlinton, who have long advocated the claims of Ceylon for such an establishment.

In the 36th annual report of the Ceylon Planters' Association, we read with reference to cotton, that "both by Europeans and by Natives it is being tried more or less experimentally in various parts of the Island, and in some cases with considerable success. Valuable addition has been made to the literature of the subject, notably by the prize essays published in the *Ceylon Independent.* The cultivation is simple and inexpensive, while under favourable circumstances the yields are quick and very considerable. Insect pests and a wet climate are the two difficulties which will probably prevent any large cultivation throughout the planting districts. But it seems probable that in the drier parts of the country the enterprise will be profitable to the native in his chena and to European companies in large plantations.

INDIGENOUS FOOD PRODUCTS: CULTIVATED AND WILD.

By W. A. De Silva.

Melastomaceae.

36. *Melastoma Malabathricum,* L. Sin. Bowitya, Katakaluwa.

This is a shrub which grows wild in the hotter parts of Ceylon, and especially abundant near streams and marshy grounds. The shrub grows to the height of from 5 to 8 feet; the stems being thin and covered with an ashy yellowish bark having a coarse surface. The stems are branched into small twigs which bear the leaves and flowers. The leaves which are green, have three prominent ribs, entire margins, and are of an eliptical shape; the surfaces of the leaves being hairy. Clusters of regular flowers, having a purple corolla, are borne on the twigs, and these give place to a fruit covered with a coarse leathery covering which bursts when ripe and exposes a bluish-coloured pulp divided into five or more carpels and containing very small seed.

This pulp is eaten by children, and it stains the mouth a blackish colour, hence the Sinhalese name Katakaluwa, and the generic name *Melastoma.* The pulp is of a sweetish, very slightly aromatic taste, by no means unpleasant. In some districts the plant is found to such a large extent, and the fruits borne in such large quantities, that the latter may with advantage be used in making preserves and jams.

37. *Memecylon Capitellatum,* L. Sin. Welikaha.

This is a low shrub which grows wild in the lowcountry of Ceylon. In some rare instances the plants grow up with a single stem to about six to eight feet. The stem, though thin, is very hard and flexible; the leaves are dark green and are of an ovate shape, with an acute apex and entire margin. The whole leaf has a shiny appearance. The flowers are borne in clusters on the stem and are of a violet colour. The fruits are round and small, and borne in clusters containing from fifty to hundred crowded together. These when young are of a pale green colour, but when ripe become jet black, and when crushed show a blue colour. The black pulp surrounding the seed is eaten. This pulp is of a sweetish taste, and stains the mouth blue. Like the last-described fruit this may also be used in making preserves.

The leaves and chips of roots and stem of this plants are used in dyeing.

Cucurbitaceae.

38. *Luffa Aegyptiaca,* Mill. Sin. Nyanwetakolu.

This is a perennial creeper which grows even in high elevations in Ceylon. Sometimes it creeps to great lengths. The leaves are palmatifid and are covered with soft hairs. The flowers are monoecious. The fruits are cylindrical in shape and attain a length of from 9 to 12 inches; in an unripe state they are cut into small pieces and made into curries. When ripe the fibro-vascular bundles are developed and the fruits become hard and leathery.

39. *Luffa Acutangula,* Rox. Sin. Darawetakolu.

This is a cultivated vegetable which is generally found in villages, but it also grows wild in some places. It is a creeping plant with a thin green-coloured stem and dark-green palmatifid leaves. The flowers are monoecious. The fruits are from 9 to 12 inches in length, narrow at the base, but gradually increasing in diameter towards the extremity. The fruit is covered with a thickly-veined epicarp, which in a young state is very soft, and sharp angular ridges are formed on the surface of the fruit. In a young state the fruit is esteemed a good vegetable, and is hence grown to a large extent in the native vegetable gardens. In the markets these fruits fetch from half-a-cent to a cent each. A creeper produces many fruits and continues to bear for nearly two years.

40. *Momordica Charantia,* L. Sin. Kariwila.

This is a creeping plant with a very thin wiry pentagonal stem, having a large quantity of branches and leaves. The *M. Charantia* is largely cultivated in native vegetable gardens, but it also grows wild. The leaves are dark-green and palmatifid, and the flowers monoecious. The fruit differs in size in different varieties, is succulent, and has protuberances on the outer surface. In shape it is long and angular.

In an unripe state the fruits are of a green colour which turns to yellowish-red when they are ripe. The seeds of the ripe fruits are covered

with a scarlet pulp, are flat, and peculiarly shaped. The testa of the seed is marked as if it had been engraved. The fruits which are much used as a vegetable are esteemed on account of their reputed medicinal properties. They have a bitter taste. The degree of this bitterness seems to vary with the surrounding conditions under which the plants are grown. The curries and different preparations made from this fruit, though relished by many, are unpleasant to some owing to the bitter taste. The leaves of this plant are said to be a good vermifuge and are used with other substances in cutaneous affections.

41. *Momordica Dioicæ,* Rox. Sin. Toombakariwila.

This is a perennial creeper, with a thin much-branched stem, growing wild in the warmer parts of the Island. It is never, or very rarely cultivated. The leaves are similarly shaped to the *M. Charantia* above described, but are smaller in size and lighter in colour. This plant is dioecious. The fruits are small, rounded in form and have a succulent pericarp, of a light green colour, covered with small protuberances which give the fruit a characteristic appearance. It forms a good edible vegetable, having none of the unpleasant characters of the preceding species. It is also considered to have many medicinal properties, and is always recommended to invalids.

A yam is found at the root of this plant which is used by Native Medical Practitioners in the preparation of different medicines, and especially those used for snake bites.

THE LAWS OF CEYLON RELATING TO AGRICULTURE

(Ord. No. 21 of 1867 amended by 2 of 1873 and 2 of 1887.)

II. *To Promote the Maintenance and Extension of Paddy Cultivation in this Island.*

"Proprietor" means, except when otherwise provided, the proprietor of paddy lands only, and includes the cultivator or person in actual possession of any such land.

"District" means any Corle, Pattu, Village or other subdivision of a province as the Government Agent thereof may deem convenient.

I. *Meetings to form Irrigation Districts.*

1. The Government Agent of any province may, whenever he thinks it advisable or upon a requisition signed by not less than ten proprietors call a public meeting to form an irrigation district for the encouragement and extension of paddy cultivation.

2. In case the extent of the District should render more meetings than one necessary, the Government Agent may form several divisions of each district and hold a meeting at each division.

II. The Government Agent to give notice of such meeting, at least one month before the day fixed for the meeting, stating its object and calling on proprietors to attend in person or by proxy in writing.

III. Meetings to be held at the time and place appointed, in the presence of the Government Agent. Every proprietor present, either in person or by proxy in writing, is entitled to declare to the Government Agent,

(1.) Whether he wishes that the district should be constituted an irrigation district within the meaning of this Ordinance.

(2.) Whether he wishes that the Ordinance should for that end be carried into operation with the aid of headmen or of Village Councils, or of both.

(*b.*) After explanation by the Government Agent of the results that would follow, according to this Ordinance, from the different modes of carrying the Ordinance into operation, if the proprietors determine to adopt the aid of the Village Councils, it shall be lawful for them to appoint a Committee of not more than twelve nor less than three persons to be associated with the Government Agent for the purpose of drawing up rules for the enforcement of ancient customs or for advising him in matters connected with the irrigation of the district.

(*c.*) Where more meetings than one are held for any district, each division to be allowed to appoint its proportion of the Committee to make up the number of the entire district.

(*d.*) Minutes of meetings to be signed by the Government Agent and to be deposited in the Kachcheri, and certified copies thereof to be transmitted to Government.

IV. Objections to votes to be decided by the Government Agent; such objections and the decisions thereon to be recorded in the minutes.

V. Majority (of two-thirds at least) to determine all resolutions proposed at meetings.

VI. Districts and rules under No. 9 of 1856 and No. 21 of 1861 to continue. Proprietors to have power to change their determination in respect of the questions referred in the 3rd section both as respects the districts constituted under the above Ordinances as well as under the present. Such fresh determination to be binding until altered again.

VII. Where proprietors cannot be convened, the Government Agent to draw up rules for the enforcement of ancient customs, and to carry this Ordinance into operation with the aid of headmen.

VIII. Acts done in contravention of the said customs or rules to be investigated by the headmen or by the Village Council according to the election made by the district under the 3rd section of this Ordinance.

II. *Headmen.*

1. One or more headmen shall be appointed, if the result of the meeting under section 3rd of this Ordinance be in favour of such a course, to attend to all matters connected with the irrigation of the district, and to prevent the infraction of rules in reference thereto.

II. (1.) Headmen shall be appointed by a majority of proprietors present either in person or by proxy.

(2.) Government Agent to have power to dismiss any headman guilty of misconduct.

(3.) Vacant offices to be filled up by headmen elected by majority of proprietors.

(4.) Till such election takes places, the Government Agent may appoint provisionally.

III. 1. Headmen may take prompt action, where such action is necessary, to prevent damage accruing to any proprietor by any act committed in breach of the rules and report it to the Government Agent.

2. If possible, before taking such action, the Government Agent must be communicated with, and his instructions awaited.

IV. Expenditure incurred by any headmen in consequence of the act of any party must be paid by such party on the production of a certificate by such headman from the Government Agent; in case of non-payment within 10 days from the service of the certificate, the Government Agent shall proceed to recover it as provided in the 6th division of this Ordinance.

V. Headmen to be paid for their services; proprietors refusing to pay to be proceeded against as provided in the 6th division of this Ordinance.

III. *Rules for Enforcing Customs.*

I. Rules for the enforcement of ancient customs to be framed by the Committee appointed under the 3rd class associated with the Government Agent. The rules framed to be transmitted to the Governor for the approval or disallowance thereof by him and the Executive Council. After approval they are to be published in the *Government Gazette*, and in the district in such manner as the Government Agent shall seem expedient. After such publication they are binding on all proprietors of land, provided they be not repugnant to or inconsistent with the true intent and meaning of this Ordinance.

II. Rules may be amended or repealed in the same manner as the original rules were framed.

IV. *Village Councils.*

I. (1.) Village Council may be convened by the Government Agent.

(2.) Notice of it to be given in the village where the party complained against resides, or where the act complained of was committed.

(3.) The Government Agent or some person deputed by him to enquire into the complaint with the assistance of a Village Council.

(4.) If the party complained against be adjudged guilty by the Village Tribunal, and if the verdict be concurred in by the Government Agent, he shall be fined any sum not exceeding £3.

(5.) The enquiry to take place in the presence of the accused party, except in case of wilful absence after receiving notice.

(6.) Sentence not to be executed unless confirmed by the Government Agent. Proceedings of inquiry presided over by a Deputy to be forthwith submitted to the Government Agent for confirmation.

II. 1. Village Council to consist of not less than five nor more than thirteen men selected by the President of such Council from among the proprietors of paddy lands in the district.

2. Government Agent or some person deputed by him shall be President. President shall conduct and keep a record of the proceedings and shall have a casting vote.

III. Proceedings to be summary and free from any formalities.

IV. Proceedings of Village Council not subject to appeal or injunction.

V. Penalty for breach of rules to be recovered in the manner indicated in the 6th division.

VI. Village Council may direct appropriation of penalties for the payment of damages incurred by the aggrieved party.

VII. Penalties to be paid to the Agent, and by him applied as directed by the Village Council, and the balance to be expended in carrying out this Ordinance into execution, and for such other purposes of irrigation works within the district as the Government Agent and the Committee appointed under the 3rd section shall determine.

V. *Construction, Repair and Improvement of Irrigatiom Works.*

I. (1.) When it is necessary to construct repair or improve any work connected with the cultivation of paddy lands, the Government Agent to call a meeting at his own instance, or on the application of three or more of the proprietors, of those likely to be benefited by such work, and to determine by a majority of their votes whether it is desirable that such work should be constructed, repaired or improved, and whether Government aid is neccssary for such work.

(2.) Where Government aid is not neccssary, a majority of the proprietors shall determine the rate of subscription in money or contribution in labour payable by each proprietor towards the work.

II. (*a.*) Where Government aid is necessary, the Government Agent to make application for such aid specifying

(1.) The allotments likely to be benefited by such work.

(2.) The names of the proprietors of such allotments.

(*b.*) The Governor, if he think it expedient, may order plans and estimates of the work to be prepared and refer the same to a Board consisting of the Government Agent of the province (and not any Assistant Government Agent), the Surveyor-General, and the D. P. W. for report on the advisability of the undertaking.

(*c.*) After receipt of report the Governor may sanction the performance of the work, and such sanction to be published in the village by beat of tom-tom.

(*d.*) After such publication the allotments of land (as set out in the specification of the Board as aforesaid, and which said specification shall be conclusive on the point) and the proprietors thereof are bound to repay the cost of the outlay as provided hereinafter.

(*e.*) Such cost to form a first charge on the several allotments and to take precedence over all mortgage, hypothecations and encumbrances whatsoever.

III. Government officers shall execute the work, option being left to the proprietors to execute the earthworks.

IV. (*a.*) The sum expended by Government in the execution of the work shall be payable in ten yearly instalments.

(*b.*) The Government Agent to assess the amount due from each allotment of land including the allotments belonging to the Crown.

(*c.*) The Government Agent shall thereupon issue a requisition to each proprietor calling upon him to pay the amount due from him on specified days in each year.

(*d.*) If any proprietor be absent from the village, or if from any cause the requisition cannot be served on him, the Government Agent shall order it to be affixed in some conspicuous place in the allotment, and the Government Agent shall further cause a notice to be published in the

village, by beat of tom-tom on three different occasions, specifying the allotments which will have to contribute towards the cost of the work, the sum each allotment is assessed at, and the time within which the different instalments are to be paid.

V. Lands required for irrigation purposes shall be acquired according to any laws now or hereafter to be in force for the acquisition of land for public purposes; the sum paid as compensation for such land shall be included in the cost of the work to be recovered as hereinafter provided.

VI. Plan or survey of channels made under the authority of the Surveyor-General shall be deemed conclusive proof of the facts exhibited therein, unless satisfactory proof to the contrary be established.

VII. The Government Agent may order verbally or in writing any person obstructing or encroaching to remove or abate such obstructions or encroachments upon channels, ponds, tanks, etc.; or non-compliance with such order the Government Agent may cause such obstructions and encroachments to be removed or abated; and for this purpose the Government Agent or any person thereto authorized by the Government Agent may enter into any garden, enclosure or other premises, and to do such things as may be necessary. The costs incurred in effecting such removal or abatements shall be recovered from the party on account of whose non-compliance with the order the costs were incurred.

VI. *Recovery of Money under this Ordinance.*

I. If default be made in the payment of any instalment due in repayment of the amount expended by the Government on the construction, repair or improvement of any irrigation work, the Government Agent or any person authorized by him in writing may seize the allotment of land herein declared bound and specially chargeable with the repayment due by it of the amount expended by the Government. If any person refuse or neglect to pay any other sum which he is made liable to pay under this Ordinance, any property belonging to him and situate within the province or district may be seized. If the amount due together with the costs and charges payable under section 3rd of this division shall not be previously paid, the Government Agent shall proceed to sell the allotment of land or property so seized, by public auction, at any time not less than 2 days from the time of such seizure.

II. Person making the seizure may place and keep a person in possession of the land so seized pending the sale.

III. The Government Agent may demand from the person by whom money is due aforesaid, or from the owner or joint owner of any property seized the several sums of money mentioned as follows:—

(1.) For cost of proceeding to the land of the person in default in order to seize the same, a charge not exceeding one shilling for every pound due.

(2.) For keeping a person in possession a charge not exceeding one shilling a day.

(3.) For the expenses of sale a charge not exceeding 6d. in the £ on the net produce of the sale.

IV. Overplus, remaining after the deduction of the above charges, to be restored to the owner or joint owners of the property sold.

V. (1.) Certificate of sale granted by the Government Agent to be sufficient to vest absolute right and title to and interest in the land sold in the purchases free from all encumbrances, whatsoever any law or custom to the contrary notwithstanding.

(2.) Such certificate shall be liable to the stamp duty fixed on conveyances of immovable property and to any registration or other charges authorized by law, such duty and charges being payable by the purchaser.

Miscellaneous.

1. Customs certified to by Government Agent to be *prima facie* evidence of their existence.

2. Powers given to Government Agent may be executed by any Assistant Agent.

H. A. J.

(*To be continued.*)

THE SUNFLOWER PLANT.

(*Helianthus Annus.*)

By W. A. De Silva.

The sunflower is a perennial, slightly woody plant, growing to the height of from three to four feet. It belongs to the composite family. The flower heads which are very gay in appearance mostly are borne on the top of the plant, though a few are also borne on the small twigs given out from the leaf axils.

The cultivation of the sunflower as an ornamental flowering plant is common in the temperate and tropical climes, but it is also being largely cultivated as an agricultural product in parts of Russia, Turkey and other countries.

The sunflower, as its name in many languages signify, is associated in the minds of many a people, more or less with the sun. There is a popular belief that this flower is attracted by the sun in such a way, that it turns round from east to west, facing the course followed by it. But careful observations have proved that this idea is a fallacy, and the power of the sun is not greater on the Helianthus than on any other plant.

The uses to which this plant is put to at the present day are many. Among these the chief one is the oil which is produced. The seeds contain a large percentage of a fine oil, as good as the best sweet oil. This oil is used for culinary as well as lubricating purposes.

The seeds which have a milky taste are also valued as a good food for poultry and birds, and is esteemed much for their fattening properties. It is said that it is a desirable food for man too.

A fine yellow dye is prepared from the large golden petals of the flowers. This dye may with advantage be used in colouring silks and other light materials.

The leaves are also of some use, and a kind of cigarette is manufactured from them, which is used to a large extent, as it is reputed to have some medicinal properties.

The whole plant is considered to be a febrifuge of great value. A decoction made from the leaves and stems of this plant is said to be very

efficacious in cases of malarial fever. It is said that this plant surpasses even quinine in this respect.

The cultivation of the sunflower for the purpose of obtaining oil has been attempted in Ceylon, but not with much success. The plant grows well in many parts of the Island, and it is worth while making further experiments not only for the sake of the oil, but for utlising its other products more fully. If such experiments are attended with success, the plant ought to prove a paying garden crop.

It is said that this plant serves as good fuel, and that it has been used for heating stoves. Perhaps this new use might induce some to make further trial whether it could be cultivated with profit.

NOTES FROM A TRAVELLER'S DIARY.

Andiyagala was the place I mentioned last in my notes. About 5 miles' journey, from this place, brought me within sight of the Kalá-Balalu Wewa, which presented an appearance which I did expect. The tank was almost dry, the sluices having been opened to irrigate the fields below. A great part of the thick forest which once covered the bed of the tank is still there, devoid of its green foliage. The fallen leaves and the felled trees were lying beneath the shallow water emitting an odour peculiar to the decomposition of vegetable matter. The following inscription appears on a granite slab at the main or the Yóda-Ela sluice:—"This sluice, originally constructed in the reign and by order of King Dhatu Sen, about A. D. 460, was, after many centuries of neglect, rebuilt in the reign of Her Majesty Queen Victoria A. D. 1886."

The very existence of the town of Anuradhapura seems to depend on this tank, without which most of the other tanks in the vicinity will be dry, and paddy cultivation, in consequence, will have to be abandoned. It seems a pity that a permanent supply of water cannot at present be maintained in this tank. The natives in the vicinity have a peculiar aversion to drinking well water. They say the tank water tastes better. There seems to be some truth in this, for I found that in most cases the well water had a brackish taste.

The town of Anuradhapura, which was, at one time, one of the most thickly-populated cities in the East, looks now more like an ill-kept Park than anything else. The place is interesting botanically as well as archæologically. Interesting water plants and ferns and trees of various descriptions could be seen here. The oldest historical tree in the world is also here, but it now seems much degenerated. The town has a small Botanical Garden. Several varieties of cotton have been tried, and the Egyptian variety seems to thrive well.

The paddy-fields at Anuradhapura are quite a sight worth seeing when under crop. Some of them were the best that I ever saw. Extraordinarily high yields has always been the result of judicious cultivation; coconuts and plantain also seem to thrive well here.

Most of the tanks in the interior villages were almost dry, and at a place called Mahadiwul-wewa, near Madawadchiya, I saw a splendid crop of paddy in a dried portion of the tank. This sort of cultivation is called in Sinhalese 'Káwala Wepiréma.' The yield is very high owing to the exceptional fertility of the soil; but the superstitious belief of the people is that the "demon" has an aversion to eating this paddy and he therefore does not steal it!

BUILDING MATERIALS.

Section I. Stone (*continued*).

By a Factory Apprentice.

Decay and Destruction of Stone.—The great agent of destruction to building stones is the damp or the water supplied by the atmosphere directly or indirectly. The precautions to be observed are very simple. "The first and foremost rule is never to employ a porous absorbent stone in the ground, or in elveation; unless in the former case it be maintained constantly wet; or in the second case, the absorption of moisture from the ground be prevented by the interposition of some impermeable material. Porous stones should never be used for parts of a building where water may lodge." Various other causes give rise to the decay and destruction, such as:—1st. Oxide of iron if allowed to remain in any notable quantities. 2nd. The crystalline sulphate of lime in consequence of the sulphuric acid they contain. 3rd. The silicates and the sulphates of iron so often met with in building stones. Decay and destruction of stone is also caused by nitrification which takes places near damp ground.

"Not only does this nitrification throw off the minute and less adherent particles of the building materials, whether they be of stone or brick, but it is also able to detach any protecting coat which may be put upon them if the adhesion of that coat to the subacent material should not be of a very energetic nature. Let the adhesion be ever so energetic, if once the action of nitrification should have been established, it must run its course, and the amount of evil it is capable of producing will simply depend upon the quantity of organic matter originally contained in the materials or susceptible of being absorbed by them from the atmosphere."

Preservation of Stone.—It is always advisable to guard against any sort of decay setting in to a building stone, since to arrest its progress after it has been once allowed to establish itself is impossible.

The following are some of the precautions observed to prevent stone decay:—1. By painting. 2. By the injection of oleaginous fatty or waxy matter. 3. By washing the face with a solution able to convert the material into an insoluble non-absorbent substance. 4. By filling in the pores of the stones with an insoluble material which should effectually exclude water.

There are strong objections raised against the process of painting, as the oil evaporates and the stone become again exposed to the atmosphere, and so the process has to be renewed.

The second process, namely, by the injection of oleaginous, fatty or waxy matter can only act

mechanically by closing the pores of the stone This coating like painting itself has to be renewed, since it is gradually detached from the stone.

The third process, that of washing the face with a solution able to convert the material into an insoluble non-absorbent substance, is one "in which the carbonates of lime are washed with a solution of an alkaline silicate, as silicate of soda or potassæ with a view to converting them into silicates of lime through the elective affinities of the lime and the silica. One objection to it is that the silicic acid is a slow one, and when the surfaces washed in the manner described are exposed to the rain, it is by no means rare to find the solution carried away."

The fourth process is to clear the stone from dust or other extraneous matter and make it absorb as large a quantity as possible of the silicate of soda or potassæ. When the solution has dried into the stone a second wash should be applied consisting of the chloride of calcium.

(To be continued.)

PRIZE DAY AT THE SCHOOL OF AGRICULTURE.

Yesterday (Nov. 29th) afternoon took place another of those pleasant gatherings which recur annually at the School of Agriculture in the Cinnamon Gardens. The entrance to the building was tastefully decorated, and the school-room had much artistic labour bestowed on its decorations. The Hon. the Colonial Secretary presided, and amongst others present were the Hon. J. J. Grinlinton, Hon. W. W. Mitchell, Hon. Dr. Anthonisz, Hon. M. C. Abdul Rahiman, Messrs. H. W. Green, J. B. Cull, T. E. De Sampayo, Mrs. and the Misses Keith, Mr. James De Saram, Dr. H. M. Fernando, the Maha Mudaliyar, Mr. C. Drieberg, Mr. and Mrs. Joseph, Messrs. C. Thomasz, Walter Pereira, R. P. Jayawardana, Mrs. and the Misses Beven, Mr. and Mrs. Schrader, Mr. C. M. Fernando, Mr. and Mrs. Jeronis Peiris, Advocate Senathi Rajah, Miss Frédoux, Mr. Ranesinghe, Mr. J. S. Drieberg, Mrs. and the Misses Attygalle, Miss Lindsay, Miss Drieberg, Mrs. and the Misses Grenier, Mrs. C. Drieberg, Rev. S. Lindsay, Mrs. A. de Saram, Dr. and Mrs. Asreappa, Mr and Mrs. F. Dornhorst, Rev. T. C. Hillard, Dr. Bowles Daly, &c.

The proceedings commenced by the President calling upon the principal (Mr. C. DRIEBERG, B.A.) to read his Report.

Report was of a very encouraging nature, and its reading was punctuated with frequent marks of applause from the audience. It alluded in terms of praise to the late Governor Sir Arthur Gordon, who had by his encouragement and patronage in previous years shown his interest in the work of the School. His Excellency Sir Arthur Havelock was prevented from presiding owing to pressure of work, but he had already shown his appreciation of the work carried on in the School by visiting it. The presence of Sir Edward Walker was an indication of the interest he evinced on behalf of the school. The report next proceeded to state the results of the operations carried on in the various provinces by the students who had been sent forth from the School. One of their men had been appointed as an agricultural instructor in the fever-stricken district of Walapane—the condition of which district the energetic Assistant Government Agent of Nuwara Eliya was endeavouring to ameliorate. That appointment made up a total of twelve students who had been employed as agricultural instructors—seven of whom were paid by Government and five privately. It was a matter for congratulation that the Government officials rendered valuable assistance to the cause of agriculture, notably the Government Agent of the Eastern Province, the Government Agent of the Sabaragamuwa Province, and the Assistant Government Agents of Matara and Kegalla. Another batch of students was leaving College on completion of their studies to engage in agricultural pursuits. It included some excellent young men, among whom was Mr. J. J. Koddipilly, who has had a brilliant career at the School. One feature of interest was the publication of a Monthly Magazine devoted to the interests of Agriculture; and this literary effort is appreciated by those for whom it was intended. The School Museum is growing in size, the Agricultural Discussion Society is well supported by both students and outsiders. A dairy has also been set on foot by the headmaster, Mr. Jayawardana, and experiments have so far been attended with success, and it is satisfactory to note that a long felt want has been supplied. Through the knowledge imparted in this branch of agriculture the students could gain a knowledge of the proper housing, feeding, and general treatment of cattle in health and disease. Another feature of interest in the report was the fact that a large variety of crops had been grown on the School grounds with the view of demonstrating the most approved methods. The report next referred to the willing help and ready assistance of Mr. De Silva, the second assistant, not only by teaching in the School but by his writings. Another student of last year's batch has been employed as a conductor on an upcountry estate; and it was satisfactory for the Principal to note that the advantages of employing such men consisted not merely in having an intelligent manager but also a disciplined and honest employee. The report concluded by speaking of the loss of their old Director, Mr. Green, to whom the School owed its existence and success, but they had also to welcome the presence of Mr. Cull, whose established reputation as an educationalist insured the successful direction of the Department of Public Instruction.

Mr. J. B. CULL, M.A., the new Director of Public Instruction, then rose and said:—Sir Edward Walker, Mr. Principal and ladies and gentlemen,—I congratulate myself in the fact that my predecessor, Mr. Green, has come amongst us this evening prepared with a speech. The School is pre-eminently a poem of his own composition; and the fact that I am so completely new to the use of the plough makes it impossible for me to comment on the nature or the results of the School in any way as adequately as I would wish. I congratulate you, Mr. Principal, on the record you have been able to present for the year. I learn that there are 26 students

on the roll, and the report of those students who have been sent forth to work in the various districts is entirely satisfactory. (Applause.) I leave it to my predecessor to comment upon the various modes of agriculture that are carried on in the Island with unvarying success in the various provinces. As regards the School itself, I note with great pleasure that it embodies one of the most noble feelings, and, what is best, it teaches the dignity of labour. (Applause.) Passing the compound the other day I was struck by seeing the boys engaged in mamotying and other kinds of operations, and in a country like this, such kind of work is eminently satisfactory. It has been wisely remarked that a man who makes a blade of grass to grow in a place where there was no grass at all is a benefactor to the country, and this is the great object of the Agricultural School—multiplication of the fruits of the earth; making nature yield more abundantly and tending to eliminate as far as human agency can eliminate the ill-effects arsing fiom untoward climatic conditions in the island. (Applause.) Reading in connection with this subject a poem written many centuries ago, the "Georgics" of Virgil, I was struck with the rule laid down regarding ploughing, in which the author recommends that as a preparation for ploughing one should take his coat off, and put his shoulder to the plough, and it is universally true that a man who cannot take his coat off and put his backbone into his plough is a very incomplete agriculturist. (Applause.) I will not occupy your time any longer in view of the speeches which are to follow, save to express my great gratification at being present here this evening, and to express the interest I have always taken on behalf of the School of Agriculture. (Loud applause.)

Mr. H. W. Green next rose, and said that the students of the Agricultural School, unlike other ordinary educational establishments, were limited to a certain number. They had a great many applications for boys, but their number was limited to 23 in his time, and now he saw it was 26. They only wanted a select number of boys, who had the interests of agriculture at heart. He read in the newspapers that one of the boys had been sent from the School to the clerical examination, but he hoped that the Principal would never allow this to occur again, for the one object with which the boys entered the School of Agriculture was to qualify themselves in agricultural knowledge and to go forth and spread forth that knowledge. When he first thought of an Agricultural School, he had many discouragements to contend with, but he was now glad to find that he had successfully broken the ice. There were eleven agricultural instructors, seven of whom were paid by Government and five privately, so that all their old students were not simply employed under Government. The improved plough had done a great deal to foster agriculture, and from the reports to hand, he found that the crops had more than doubled their usual yield by the use of the plough. They had sent out their young men to work with the improved ploughs, and they had all done good work. The other day he sent out a hardworking man to work in a place some 19 or 20 miles from Trincomalee. The people there were not inclined to work at first, but the speaker himself spoke to the people and told them that if they did work, they could share the profits equally and so ward off starvation. At last they did set to work, and they got a good return and shared the profits. He moved the instructor on to the next station, and the result was so eminently gratifying that here were several applications for the ploughs. Their object was to disseminate a knowledge of agriculture so that others might follow the example; for he found the Sinhalese people always ready to take advantage of opportunities offered to them. They wanted the young men to work. A good many had already taken advantage of employment on estates, and he was quite sure that the education received here would not be thrown away in vain. In conclusion he wished all success to the institution and wished the pupils good-bye. (Applause.)

The distribution of awards then took place according to the following list, each recipient as he came up to receive his gift being heartily cheered by his comrades:—

Seniors.—Agriculture, Chemistry, Botany, Zoology, Entomology, English, History and Geography, Mathematics, and Practical Chemistry (the late Mr. de Soysa's prize) all gained by J. A. Kodippily; Veterinary Science was won by A. Drieberg; and Practical Agriculture by J. P. Ranasinghe.

Juniors.—Agriculture and Geology by P. V. Cooray, and Chemistry, Botany, English, History and Geography, Mathematics, and Field Surveying (the Grenier prize) all by E. M. Johannes.

THE PRESIDENT'S SPEECH.

The prize-giving over, Sir E. Walker said:—Mr. Principal and ladies and gentlemen:—It gives me great pleasure to come here today and to make the acquaintance of the School of Agriculture and to join with you by your presence in the expression of encouragement to the masters who have been engaged in teaching the boys during the past year and congratulating the boys themselves on their course of study. (Applause.) I trust that those who have received prizes today will find in them an encouragement to persevere in after life and to exercise that industry which have enabled them to attain certificates. I am not altogether a stranger to the School of Agriculture. The deservedly high terms in which Mr. Green has spoken of the institution I am well aware of, as it has been my good fortune to have been much associated with Mr. Green, and from him I have from time to time heard a great deal of the School and have been much impressed with the zeal and the interest he has taken in it. (Applause.) I think the Principal in his Report has very rightly expressed regret at his loss, but it is not a very real loss after all, for you have in his successor a gentleman who has the interests of practical education at heart, and I feel sure that he would use his best efforts in furthering the work of agriculture. (Applause.) And you have Mr. Green in a position to help you at the Governor's elbow and as my principal colleague and assistant. As regards the work of the School I have heard of several accounts disparaging and discouraging the work and utility of the education given in this institution. Of course it would be difficult by statistics to show how valuable the School was,

but I am of opinion from all the information I have gathered, that those boys who have been sent forth from this School into the various provinces of the island are doing good work in agriculture. (Applause.) I put the question to Mr. Drieberg when I came into the room whether during his travels about the country he had seen good work being carried on in agriculture as the result of the money spent on it, and he unhesitatingly answered in the affirmative, and I think we may take his opinion as one of considerable value. His opinion is, moreover, of an independent character, because he belongs to this country, and it is not as if he were speaking of the results of his own labours, but of those who have gone before him. Some people have tried to throw cold water over the school: but if the boys only worked quietly and persistently their labours would bear much fruit. (Applause.) The Principal has referred to a pupil who had gone to the district of Walapane. Well, I know of no one who is likely to do more good to that unfortunate part of the district than one who would instil into the poor people there some knowledge of agriculture, and if he did that he would certainly accomplish more than what Government officials and Colonial Secretaries had yet been able to achieve. In conclusion, I have only to express the great pleasure it has given me today in taking part in the prize-giving this year. (Loud applause.)

The Hon. Mr. J. J. Grinlinton followed, and in the course of a spirited address urged on the School the desirability of experimenting upon the system of transplanting paddy. In some parts of the country this system was a success, while in other parts it was a failure, chiefly because in many cases transplanting took place at the wrong time and the plants died. He hoped that the matter would occupy the attention of the Principal and his puplis, for transplanting was carried on on an extensive scale with various other products, and he saw no reason why they should not carry out experiments in transplanting paddy. With regard to the remarks which fell from the President and Mr. Green that cold water was being thrown on what they did by some people, he believed that these people were everywhere in the world, and the very men who had not lifted a finger to help them and had done all they could to discourage them would whenever they heard that success did attend their efforts, say "We told you so." (Laughter and applause.) He counselled the young men not to trouble themselves about the criticisms levelled against them, but simply to work on steadily and success would assuredly follow. He was sorry to find that the Sinhalese nation were not giving that attention to cultivation which they did in the ancient days. In those days their one ambition was to possess and cultivate the land, but now the majority of the young men only tried to get educated and seek employment under Government on the smallest pittance. This, the speaker said, was what ought to be discouraged; and he thought the best thing for our young men to do was to put their shoulders to the plough and to give their attention to agriculture. (Applause.) In addition to agricultural knowledge, a knowledge in mercantile matters was also indispensable. He would instance the case of those gentlemen in England who were trained to agricultural pursuits in preference to a berth under Government, and he maintained that if the young men only considered the advantages to be gained from a knowledge of agriculture, they were bound to succeed in life. In conclusion, the speaker proceeded to advocate technical training. The School was only in its infancy, and they had heard of the success which had attended their efforts; and if success had attended efforts where difficulties had to be surmounted before, he had no doubt that a school for technical education would also meet with success. (Applause.) Without technical education the School could not prosper, and he would be very glad if technical education was brought to the very doors of the natives. (Loud applause.)

Mr. H. W. Green referring to Mr. Grinlinton's remarks regarding the system of transplanting said that was the first thing he started with, as it was the system which brought out the best returns. In China and Japan this system of transplanting brought enormous folds, and even transplanting in the sandy soil at the back of the room resulted in a yield of 539-fold. Another great advantage in favour of transplanting was that 10 measures sufficed to plant out an acre of land, whereas the people usually used two or two and a half or three bushels an acre. The system too could also be carried by means of a nursery in one corner of the field, and during a period of drought the cultivator would be able to water this small piece of ground from his chatty and thereby to tide over the period of drought without being starved. (Applause).

The President said that in bringing the proceedings to a close he wished all the pupils a successful career. He might mention that in connection with the eleven students who had left the institution for the various provinces, the fact that five had been employed by private parties indicated that they had shown an independent appreciation of the worth of the School. (Applause.)

Three hearty cheers having been given to Sir E. Noel Walker for presiding on the occasion, followed by rounds of cheering for the Principal and the visitors, the gathering adjourned to the green, where light refreshments were partaken of: the Band of the C. L. I. V. treating the people to some excellent music.

GENERAL ITEMS.

Mr. H. S. Holmes Pegler, Author of "The book of the Goat," writing to the *Agricultural Gazette* on the milking properties of goats, says that two quarts a day is a fair average for a good milker. A goat which was exhibited at the Royal Aquarium Show and won the milking prize gave nearly a gallon a day. In Switzerland and Malta much attention has been given to the improvement of the milking qualities of goats. Regarding quality, Mr. Pegler says that in almost every case goats' milk is richer than of the cow; heavy milkers, however, as a rule supply a comparatively poor yield. In order to compare the comparative richness of the milk of the goat and the cow, an analysis was made of the milk from a Cashmere goat belonging to the Queen, and that of a Shorthorn cow, winner of

the Champion Cup in the milking trials at the Dairy Show of 1888. While the goats' milk was found to contain of water 80·72 per cent, fat (pure butter) 6·93, and solids other than fat (casein, sugar, and ash) 12·35; the cow's milk gave the respective percentages of 87·56, 3·63, and 8·81. The sample of goats' milk thus showed 7 per cent less water, while it contained nearly twice the quantity of pure butter fat, and half as much again of other solids. Besides its riehness and nutritious property, goats' milk has the merit of being extremely digestible, and is accordingly recommended by medical men as a diet for invalids and ehildren. In Ceylon goats are of no great importance as milk-produeers among the natives, though the Hindu and Mussalman classes use the milk to some extent. The value of the milk as food for invalids and children is, however, recognised even here.

Says the Melbourne *Leader*, in an artiele on valuable vegetable produets:—The Indian Arecanut is règularly eaten every day in the year by 100,000,000 of the population. There is an annual importation of upwards of 30,000,000 lb. from Ceylon, the Straits Settlements, Sumatra, and they are exported in considerable quantities for the use of the Indians living in Zanzibar, Aden, Mauritius, China, and other eountries. The fresh nuts have intoxicating properties and produce giddiness. These objectionable properties are much diminished by heat and by drying, and many cautious people deeline to use any exeept nuts which have undergone a process of cooking and are known by their eolour. The original wild nut was intoxieating, but the only nuts now used are from eultivated trees, and these are milder. They are only intoxieating when unripe, and then but slightly. The nuts are eaten with the betel leaf, the praise of which is sung in ancient Hindu books which attribute to it no less than 13 valuable properties which are duly enumerated. Modern medieal men vouch for the fact that essential oils of betel leaves are highly beneficial in catarrhal affections and throat inflammations. Further researches into the properties of the nut and leaves are evidently called for, because their preparations by native methods are a good deal regulated by superstitions. The betel leaves are mixed with other spices used with lime to form *pan*, with whieh the nuts are eaten. An organie poison can be extracted from the nut, and when this is injected under the skin of rabbits and cats they die a few minutes; but the same may be said of a great many vegetable productions, the Kola-nut inclusive, whieh are usually regarded as harmless. Even the lettuce eontains sueh a poison. The areeanut is grown on a palm whieh is supposed to be indigenous in the Malayan peninsula and islands, but is not now found in a wild state. The Indians no doubt indulge too freely in the use of the arecanut and betel leaves, but for exceptional use they may be found to be medieinally benefieial. If the reverse be the case, further investigation is demanded on behalf of the 100,000,000 betel eaters. It is a popular idea among betel-chewers that the ehewing mixture has digestive as well as antiseptic properties.

Mr Johansson, a Swedish Engineer, claims to have invented the simplest and most rapid machinery by which new milk can be eonverted into butter. The process takes less than three minutes, and the machine could deal with 1,500 pounds of milk per hour. Mr. Johansson received the highest award at the Royal Agricultural Society's Show last year.

A trial of ploughing by means of electric motors is about to be made on the property of the Marquis de la Laguna. The power of a waterwheel of some 20 H. P. will be employed, and the implement for working the land is exeepted to work at a distance of 3 miles from the generating dynamo.

During the year 1889-90, says the *Madras Times*, there was a general rise in the prices of the principal food grains and horsegram throughout the Madras Presidency as compared with the two previous years.

The value of charcoal to plants is not so much as a fertilizer as an absorber of ammonia both from the atmosphere and the soil. It is further elaimed for eharcoal that it prevents attaeks of inseets and fungi.

The British Consul at Bahia has more than eonfirmed the wonderful stories told of the properties of the Kola nut. The Kola-eating Afrieans who labour at the unloading of vessels are said to work and earn twiee as much as their eompetitors. The beans which are described as unintoxicating and in no way injurious, are said to act as a nutritive and quench thirst: yet they are not strietly a stimulant. The beans are best soon after they are gathered, and are sold aceording to freshness at twopence or threepence each bean. At the request of the Government of India praetieal information regarding the extraordinary properties of Kola-nuts has been supplied by the authorities at Kew.

Dr. Henry Baker of Miehigan remonstrates vigorously against the proposal to diseard the fumes of burning sulphur as a disinfeeting agent. He shows by tables and diagrams the eontrolling power of this disinfeetant, and attributes its alleged failure as such to the use of too little sulphur. The burning of 3 lb. of sulphur to the thousand feet of air spaee is suffieient to destroy the germs of eontagious disease in a closed room, without extra moisture in the room. In support of his position he quotes the results obtained by reeent French experiments in this field.

The members of the Indian Agrieultural Conference were unanimous in urging that educational primers of an agricultural eharaeter should be introdueed in all primary sehools, and also that arrangements should be made for the supplying of a high-class education in Agricultural Science to all who desired follow it out.